ISWA
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Guidelines on How to design an appropriate waste fee

Principles, Practices and Applications of Waste Management Fees

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Grant Applicants:

Technisches Büro
HAUER
Umweltwirtschaft GmbH
A-2100 Korneuburg, Brückenstraße 6
+43 2262/62 223 www.tbhauer.at

TBU
Environmental Engineering
CONSULTANTS
A 6020 Innsbruck, Defreggerstr. 18
Tel. +43/512/393733 Fax -3937332
office@tbu-austria.com www.tbu-austria.com

External Partners:

EKO KONSULTACIJOS
J. Galvydzio str. 3,
LT - 08236 Vilnius, Lithuania
+370 5 274 54 87
+370 5 274 54 91
www.ekokonsultacijos.lt

eko-dep
REGIONALNA DEPONIJA
Miloša Crnjanskog 38
BiH - 76 300 Bijeljina, Bosnia I Hercegovina
+387 55 224 830
+387 55 202 085
www.ekodep.com

e-mail: tbhauer@tbhauer.at
www.tbhauer.at

Table of contents

1 BACKGROUND 4

2 OBJECTIVES 5

3 GENERAL REQUIREMENTS 6

4 INTERDEPENDENCY BETWEEN COLLECTION SYSTEM AND FEE MODEL, AND SUITABLE DATA TO BASE THE FEE ON 8

5 DISCUSSION ON THE EFFECTS OF DIFFERENT FEE MODELS 9

5.1 FAIRNESS 11
5.2 AFFORDABILITY 15
5.3 SOCIAL EFFECTS 16
5.4 ADMINISTRATIVE AND RELATED COST 17
5.5 COST FACTORS TO BE COVERED - FIXED AND VARIABLE COSTS 17
5.6 CITIZENS´ BEHAVIOUR AND STEERING EFFECTS 18
5.7 INFLUENCE OF THE COMPETENT AUTHORITY IN THE DEVELOPMENT OF MUNICIPAL WASTE MANAGEMENT 20
5.8 HOW TO HANDLE COMPANIES 21

6 WHO SHOULD COLLECT THE FEE? 23

7 HOW TO DESIGN A WASTE FEE - THE TEN COMMANDMENTS 24

8 EXAMPLE VIENNA 25

9 REFERENCES 27

1 BACKGROUND

In any up-to-date solid waste management system *fees* represent an important component. However sometimes fees are not given the attention they deserve ("hard" technical elements usually do much better in this respect), and sometimes fees are not applied in a way which helps create the desired effects. Waste fees should not only *finance the entire system*, but also *provide an overall steering function*, encouraging the waste generator to take full advantage of the whole system, particularly opportunities to feed suitable waste streams into separate collection sub-systems provided by the overall system operator.

Fees are understood as a payment for a service. The difference to a tax is the existence of a direct linkage to a special service which can be observed and used by the fee-payer. A waste management fee is the payment for municipal waste management services. This payment should cover all costs involved in the collection of different waste streams, treatment of waste collected (recycling or disposal), administrative work, PR-campaigns, operating waste management facilities, possibly street cleaning, etc.

Municipalities from East and South East Europe often adopt – if the "User Pays" principle is introduced at all, and a fee is collected at the waste generation level – a SWM tariff based upon floor space[1]. There is a noticeable tendency to introduce a more "fair" waste fee (be it based on generated waste weight, or volume) – with the positive steering effects envisaged above, however sometimes also with certain practical problems (starting e.g. with a limited preparedness of some waste generators to pay *any* fee).

The present project – which is to perform workshops on the topic in two selected entities and to prepare hands-on guidelines on appropriate fee design based upon the workshop findings – is co-financed by a grant issued for 2011 by ISWA.

[1] in countries which were part of the Austro-Hungarian Empire it seems to be a rule (note that waste tariffs in the various successor states of Yugoslavia do not differ at all from those Austrian tariffs based upon floor space as in practice until a decade or so) and Eastern Europe very often applies space-related waste tariffs as well.

2 OBJECTIVES

The overall scope of the project – the central pillar of which is represented by the outcome of two workshops performed in summer 2011 in Lithuania (Vilnius) and Bosnia and Herzegovina (Bijeljina) – is:

- to provide basic knowledge as well as practical, first-hand experiences in respect to the design & steering elements of a "waste fee"
- to better understand practice as well as constraints of municipal fee management in post socialist countries, and
- to prepare an ISWA-guideline "How to design an appropriate waste fee ?"" based on the workshop results.

In the present guideline some effects of different models of waste management fees are discussed. The guideline cannot give a recommendation to any one single fee-model. The model to be chosen depends on various influences which differ from region to region. So the guideline tries to show experiences with different models and provide an overview of which effects should be kept in mind when developing a suitable fee-model.

The following effects will be discussed:

- Fairness
- Social effects
- Interdependence of fee-models and the collection system
- Cost factors to be covered – fixed and variable costs
- Behaviour of residents / steering effects
- Administrative costs
- Influence of the competent authority in the development of municipal waste management.

3 GENERAL REQUIREMENTS

Waste management fees have to follow a lot of different requirements. Some may be given by law, e.g. the adoption of a polluter (user) pays-principle, some represent economic needs, e.g. financing municipal waste management, some are “soft” aspects like social aspects and a general request for fairness. Some aims are controversial. Therefore a single model cannot fulfil all aims completely. Each model has to be a compromise suited to the local / regional situation. It is very important that the compromise is founded on a sound knowledge of the different effects to be expected. An overview of the different effects that can be expected is presented later in this paper; this information is aimed to provide guidance for the modelling of an appropriate waste fee.

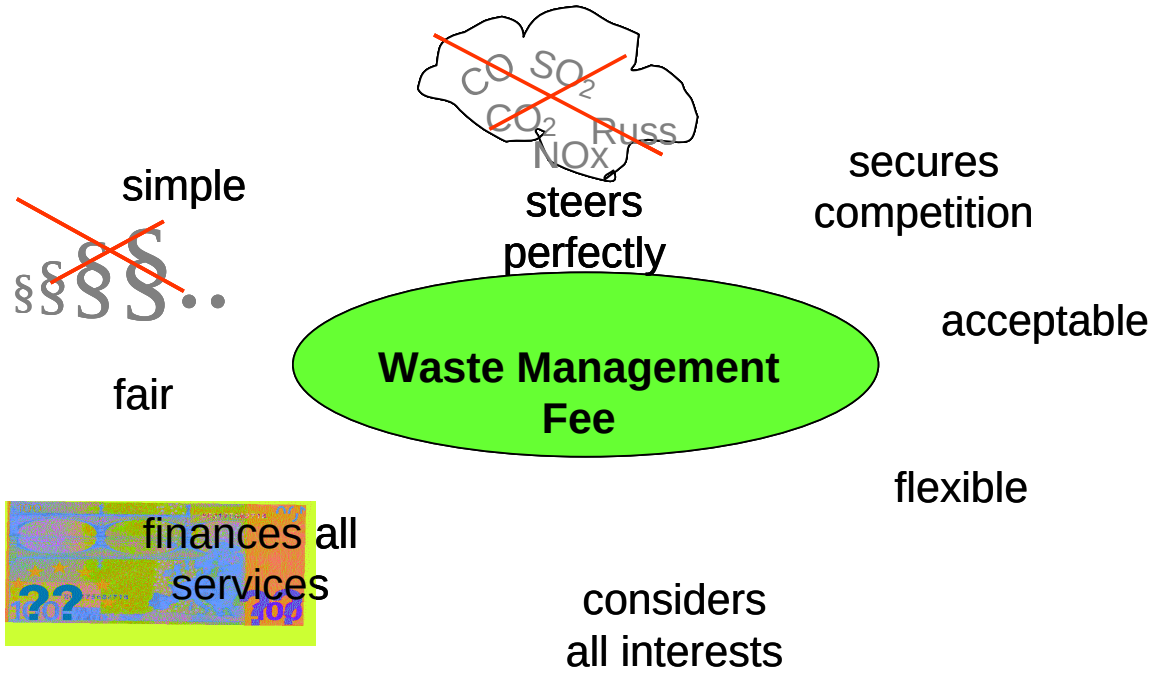

Fig. 1: General requirements of a waste management fee

General requirements of waste management fees are

- The User Pays
- Each facility has to be connected to public waste collection
- Certain commercial and institutional waste generators may take back the responsibility for collection and disposal from the Municipality. They turn into "self-disposers".

- Tariff should incorporate / represent an incentive to support the system´s policy (in Europe this is the „3 R´s“ reuse, recycle, recover)
- KISS – **K**eep **I**t **S**imple, **S**tupid
    - It reduces administration efforts
    - It reduces regulatory requirements
    - Transparency counts in the long term.
- Tariffs are due on a regular (monthly to yearly) basis
- No differentiation between collection and disposal cost.
- The differentiation between
    - „household waste“ (which remains under the Municipality´s responsibility in any case) and
    - „commercial waste“ (which might be disposed of under the self-responsibility of the relevant generator, e.g. a supermarket chain)

  usually is done according to waste composition and/or amount.

4 INTERDEPENDENCY BETWEEN COLLECTION SYSTEM AND FEE MODEL, AND SUITABLE DATA TO BASE THE FEE ON

The fee model has to be in line with the type of waste collection system in place. If waste is collected from containers situated at public places, the fee cannot be based on single containers. In such a case the fee has to be based on measurable data related to a single premise on which the waste is being generated. Such data can be for e.g. number of residents, floor space, or the value of the property.

It has to be considered that some data might change often requiring regular database updates (additional administration). The number of residents can (and actually does) change often, and quickly.

It is recommended that municipalities use data which is:

- easy to be collected
- easy to be updated
- based on a figure that can easily be understood

If the service is being provided for single premise collection containers, the fee can be based on the volume of the container as well as the number of emptyings performed by the collection service.

5 DISCUSSION ON THE EFFECTS OF DIFFERENT FEE MODELS

In the following chapters some effects of different fee models are discussed. As outlined above, each fee-model is a compromise. However it is a must to make the compromise with full understanding of the sometimes conflicting requests.

This study uses the portfolio methodology to compare different models; this methodology shows the dependency between different effects. In the following figure two examples are presented. In the first example five different fee models are compared concerning their effects on the administrative effort and with respect to "fairness". If a dot is situated close to the bottom and far right the model is seen as very fair and at the same time it can be handled with little administrative effort.

The majority of the workshop participants have indicated that the model "*Fee concerning measured individual waste quantity*" (yellow dots) is relatively unfair (dots placed bottom left). However they have mixed views regarding the anticipated administrative effort. Some think that the administrative effort will be low (dots placed bottom of y-axis) whilst others think that the administrative effort will be high (points placed top of y-axis). As another example the model "*Fee on the basis of the number of residents*" (green dots) has been viewed to involve a similar administrative effort (neither high or low) by almost all of the participants (dots placed close to the middle of the Y-ax).

The portfolio method allows stakeholders to identify and visualise any uncertainties/different views regarding the anticipated effects of a certain fee model. If uncertainties exist and different stakeholders have different expectations of the fee models effects, then further investigations and collection of more information is needed to gain a clearer picture.

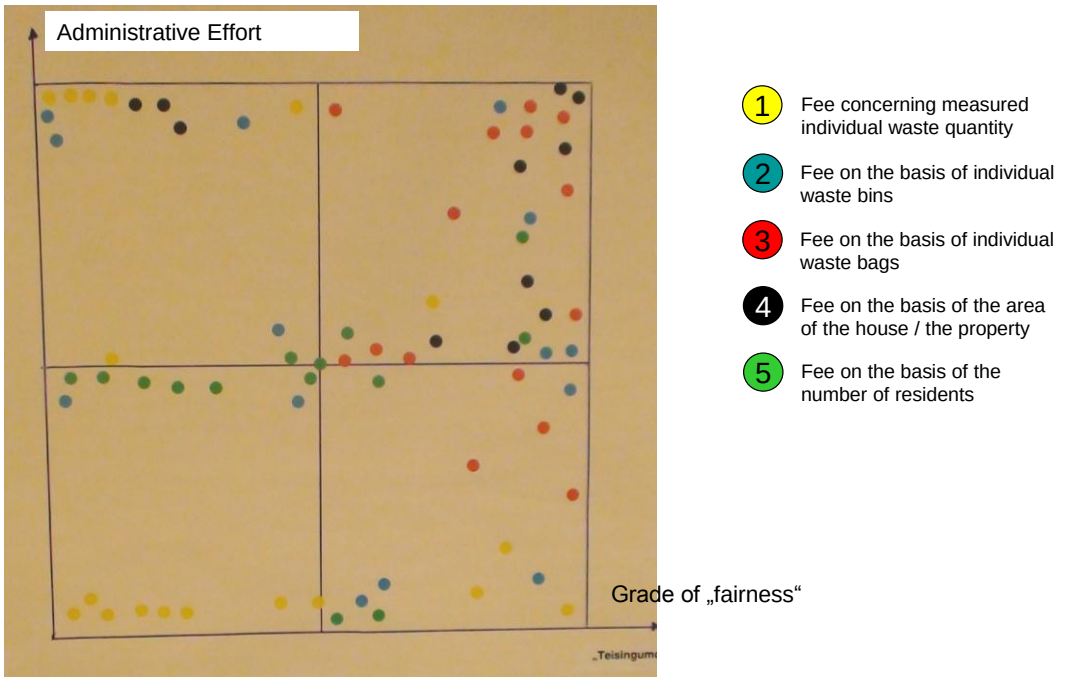

Fig. 2: Example 1 for portfolio to show effects of fee models

In example 2 most of the yellow dots are located in the lower left region of the graph. This illustrates that fee model 1 (yellow dots) is viewed to be an ineffective steering tool for reducing the quantity of residual municipal solid waste but at the same time a low danger for fee avoidance. Whereas model 3 (red dots) is seen as an effective steering tool but is combined with an anticipated high risk of fee avoidance (most dots are situated in the right upper region of the graph).

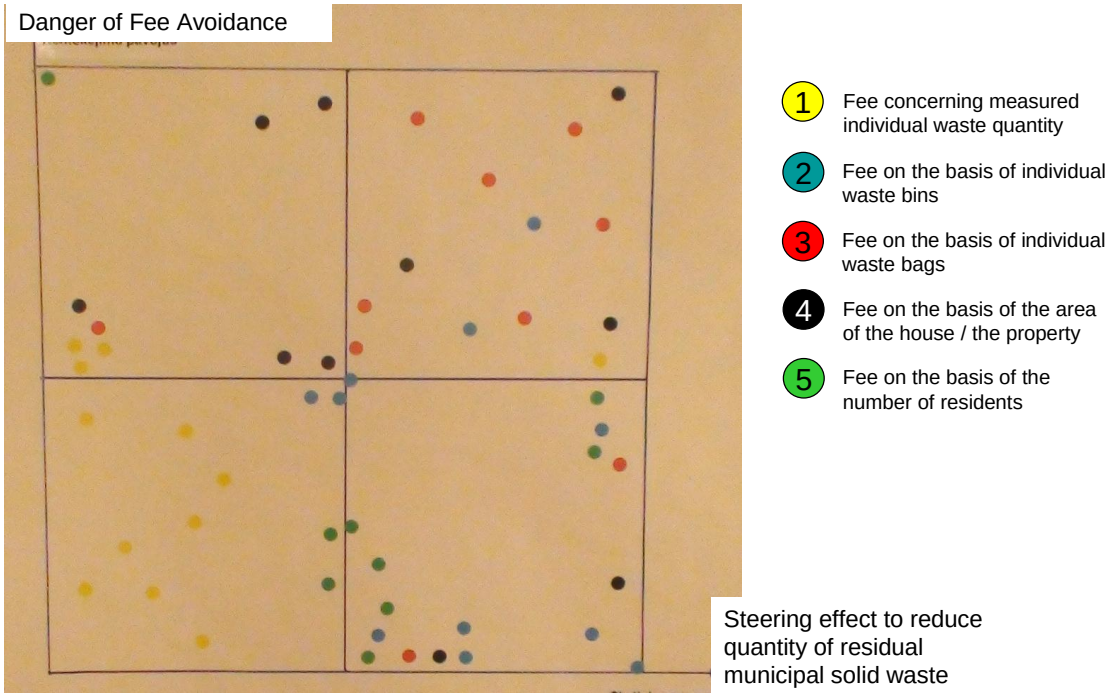

Fig. 3: Example 2 for portfolio to show effects of fee models

5.1 Fairness

The degree of fairness of a waste management fee imposed on users is one of the most debated aspects of the fee; both when it is first introduced and when it is subsequently altered. It is virtually impossible to introduce a waste management fee that can be unanimously agreed to and perceived as 'fair', by all stakeholders. The task of waste managers is to find the right balance. In brief:

> *"Each fee model has its specific level of unfairness, depending on the stakeholder concerned".*

Additionally it needs to be considered that sometimes precise data is needed to judge fairness, which can be difficult and costly to obtain. Each additional measurement of waste, like the mass (weight) and volume of waste, costs more the smaller the unit being measured. The mass of waste from a whole municipality can easily be measured by weighing the collection vehicle at the disposal site. Measuring the mass of waste from single collection bins requires much more effort. Measuring the quantity of waste disposed of by different users (e.g. residents of a multi-storey building) into a single bin causes even further additional effort.

Fig. 4: MSW collection containers with lockable lids.
Main lid can only be opened by collection staff (when emptying the container). Filling slot opens after paying the fee (by inserting coins, modern systems also offer cashless transfer).

The easiest way to consider waste quantity is to apply the fee to the volume of the waste bin, multiplied by the number of emptyings.

It is recommended that municipalities calculate the fee on the basis of a single premise (building), however not to practice further splitting of the fee down to single households / single proprietors. Such, if requested for, should be left to the administrator of the property, and its details (cost sharing based upon floorspace, etc.) decided by the owners.

Differences in settlement structures

Another aspect of fairness is the handling of premises in different types of dwelling structures – e.g. a closed village compared with single houses in an open field. The longer the distance between the collection points, the higher the cost, but: is it fair to apply a different fee in such a case?

Buildings that are occupied for part of the year

Another common subject for discussion is the allocation of fees for buildings that are only occupied for part of the year (such as holiday houses). Here it seems to be practicable to split properties into categories, like “occupied the whole year” and “occupied from March to October only” – and consequently to secure that no collection service is provided beyond the period a fee is paid for and to be sure that the building is really not used in this time.

Differences in generated waste quantities

A classical point in discussion on “waste fee fairness” relates to the differences in generated quantity (“I am doing separate collection, but my neighbour is not – so why aren’t I rewarded for my efforts?”). Should the actual quantity of waste collected from a single source (premise) be measured?

The clear assigning of waste to a single source and with absolute accuracy is only possible if there is *no* collection provided at public places, and each generator has their own receptacle. More recently the market has been offering “technical” solutions to overcome this barrier– see Fig. 4 –, however at disproportional high costs (the lid of the container shown in the example costs several times the amount to be paid for its body) combined with the likeliness that certain individuals will dispose of their waste *next to* (in the better case), but not *inside* the container.

One practical solution to account for waste quantity (presented briefly already in chapter 4) is to establish a fee based on the size of the container and the collection frequency. If in addition the fee needs to consider the actual weight or volume of waste in the container at the time of emptying, additional measurements are needed. Experience shows that such additional measurement makes waste collection more expensive:

Additional fee fairness costs additional money.

Collection cost increases by 10 to 15 percent if measurement of volume and/or weight of each container is done[2]. As long as this "cost for fairness" is paid by those who are directly concerned (e.g. by the residents of a single multi-storey building deciding on their individual cost management) there is no argument– however it should not become part of the municipal waste fee.

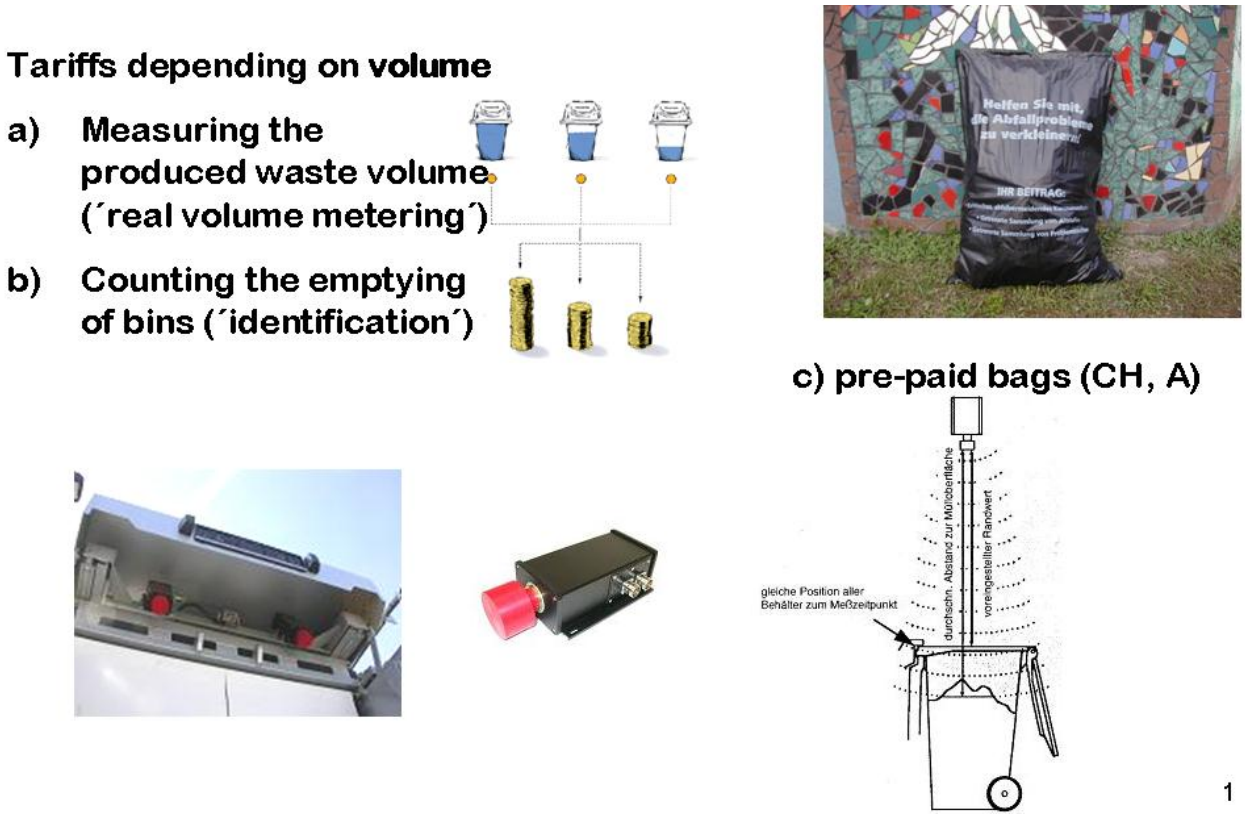

Fig. 5: Technical (a, b) and organizational (c) solutions for measuring waste volume

A simpler, nonetheless effective method for measuring waste quantities is *to count the number of emptyings.* With a basic fee the resident pays a certain number of emptyings, e.g. 35 times per year. The collection vehicle comes every week (52 times). Each time the waste bin is situated for emptying at the roadside (signalled by the waste generator "My bin is full, I request collection service!") it will be emptied, and these emptyings are counted (either via stick-on labels or a "banderole" system, or automatically, for examples refer to Fig. 6).

[2] Result of tenders where all cost factors have been reflected (for service contracts spanning five and more years).

Emptying's in addition to those that have been "prepaid" (e.g. 35) will be charged additionally. This model based on the number of emptying's can also be realised with the use of prepaid bags where a given number of bags (covered by the waste fee) are supplied per year; if further bags are needed they have to be paid for in addition. Furthermore the use of bins and bags can be combined. Normally the household uses the bin which will be emptied a given number of times. If there is additional waste the household can buy a bag und situate this bag together with the waste bin at the roadside.

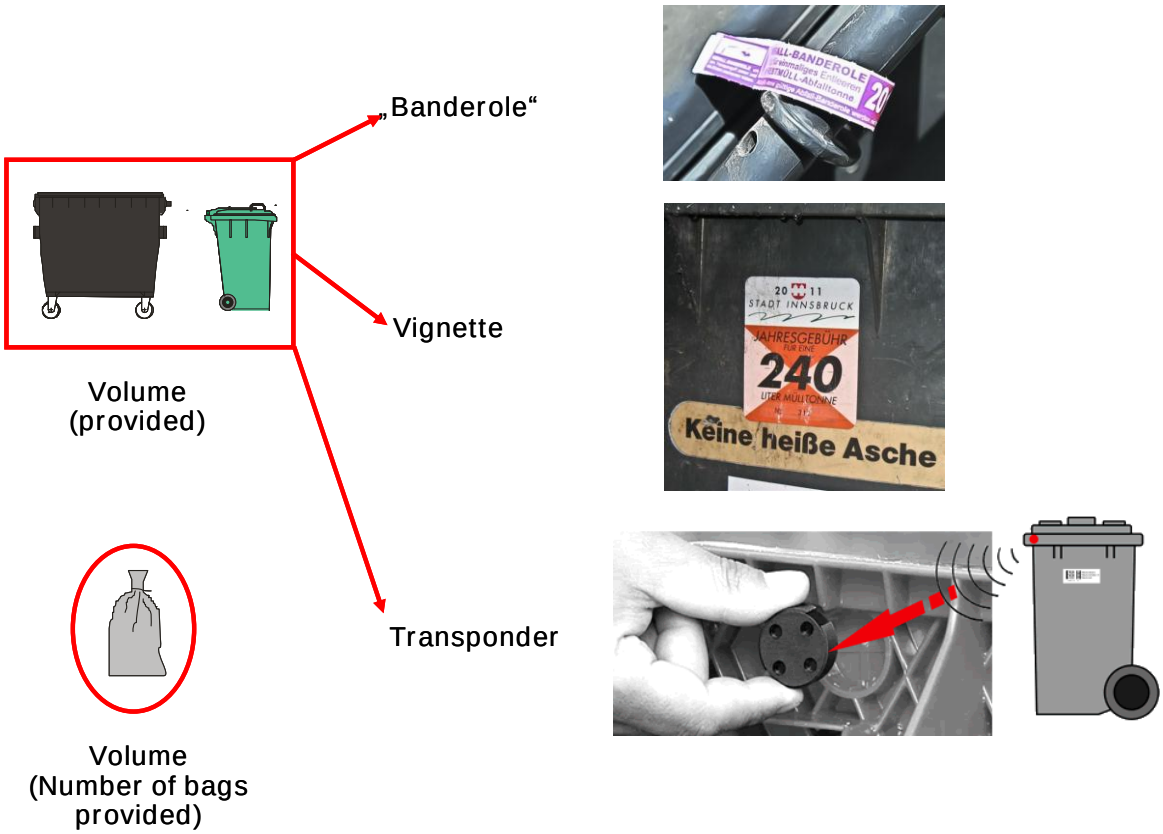

Fig. 6: Methods for counting the number of emptyings

It is important to note that only the variable costs are affected by waste quantity, and the variable costs make up only a certain (small) part of the total costs. The fixed costs, like the cost of the collection vehicle (annuities same as e.g. fuel cost) including staff for driving to the collection address do not depend on waste quantity (i.e. if the bin is full, or only 60 % fill) – for more about this topic refer to chapter 6.4.

When the waste management fee is based on an individually measured weight or volume (i.e. the actual amounts generated at the household level) the additional administrative effort has to be considered. Also the effects of achieving *fee-minimisation instead of waste minimisation* have also to be considered as well as social aspects; these factors are discussed below.

Each fee model contains its specific unfairness

An overview on advantages and disadvantages of different fee-types is presented in Fig. 7.

Fee based upon quantity	Average fee (flat rate)
+ Fair system: the more waste generated, the more is paid (The User Pays principle)	+ No incentive for illegal dumping, but at the same time no incentive for reducing waste quantity (e.g. by separate collection)
– People can avoid paying (by illegal dumping, using the neighbour´s bin, …)	+ Easy to administer if the fee is part of another fee related to buildings
– Size of container and frequency of emptying have to be known	+ Easy to administer if the fee is fixed by known data, like area of the building, number of inhabitants, …
– Each house has to have its own container usable only by residents of this house	– Difficult to administer if no such data is available, or changes often (number of residents)
	– The User Pays principle is not realized

Fig. 7: Overview on advantages and disadvantages of different fee types

5.2 Affordability

Compared to the costs for other public services (electricity, water supply, waste water, transport, education, telecommunication…) expenditure for waste collection and disposal are low– however this fact (which applies equally to ´advanced´ countries as to ´poor´ countries) is not usually reflected by the citizen´s general perception. Fig. 8 below shows a typical result of relative living costs taken from a poll conducted during this project (the participants of the poll come from Bijeljina where no fee is actually charged for waste management). Irrespective of the level of economic development of a society the cost (thus fee) for waste services are lower than other “living costs”.

However, it seems the challenge to collect service fees is unique to waste related services, when compared to receiving payment for other public services – which is often misinterpreted as a sign of “social / economic non-affordability”. The real cause is the simple “technical” fact

that it is so much easier to dispose of waste “illegally” (i.e. without paying a fee) than it is to receive goods or services without payment (water, electricity, telephone).

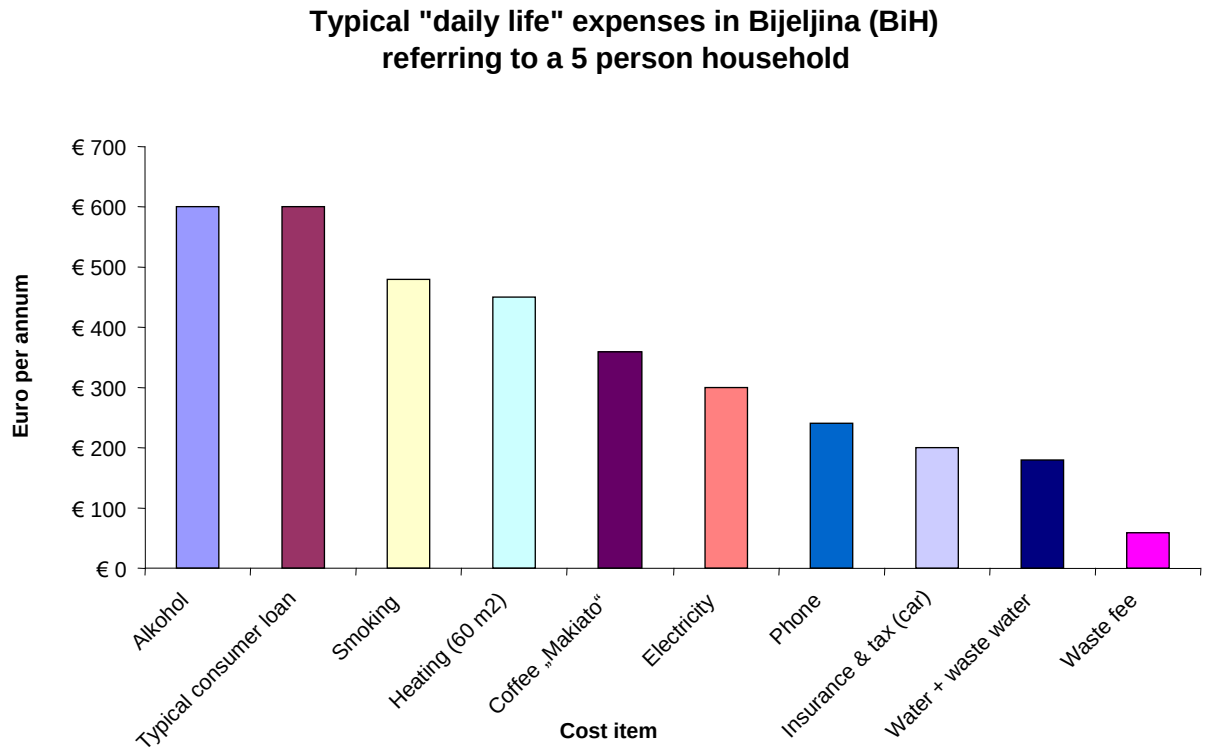

Fig. 8: Result of a poll (conducted during the project) “Tell me about some typical living cost in your city”. Values are averages agreed on from an audience of 25 persons.

5.3 Social effects

Social effects are to be viewed closely with “fairness” (chapter 5.1). The social factors that are usually considered, relate to particular situations like families with children, households with infants or infirm using disposable-diapers, apartments or houses occupied by a single person, families with extreme low income (per person), properties far away from agglomerations, and the like.

It is recommended not to differentiate the waste management fee for certain groups of residents, companies or other legal entities. If a special group should be supported by the municipality this support should be given individually – e.g. by separate funding or other support – but not with reduced fees. Remember: KISS Keep It Simple, Stupid.

5.4 Administrative and related cost

Each fee model requires data which has to be administrated. The more simple a fee model, the lower the administrative costs. Data which changes often is especially difficult to manage, e.g. the number of residents in a house. Therefore stable data is easier and less costly to manage, such as data concerning the property, respectively the building, like address, size of the property, living space and name of owner or administrator.

The minimum data which is needed includes:

- Address of the property
- Name and address of the owner
- Name and address of the person who pays the waste management fee (if different from the owner).

Any additional data such as needed for more sophisticated fee models, causes extra costs to administer and keep up to date.

5.5 Cost factors to be covered - fixed and variable costs

Fixed costs are the costs incurred irrespective of the actual quantity of waste disposed of into the number of containers that are serviced. The fixed costs cover nearly the entire collection costs, all administrative costs, all costs for public relations and costs for the collection of recyclables which are covered by the fee on residual MSW. The only variable costs are those related to treatment, and a small part of collection costs.

Experience shows that $^{2}/_{3}$ of the entire waste management costs, or even more, are fixed costs, in any case they are significantly higher than the variable costs. The lower the price for waste treatment, the more the ratio of fixed costs to variable costs increases. A simple calculation can show how limited the effect of a fee relating to waste quantity can be when considering real terms, for example: The fixed cost is assumed to be 70 % of the total cost, one premise has a half-full container, the neighbouring one has the same container, but full. The cost to provide collection for these two addresses differs only by 15 % – the share of variable cost (= 30 %) divided by two (half the quantity) – not 50 % as is usually perceived.

Sometimes fixed and variable cost are charged separately, e.g. as a *basic fee* and as a *top-up fee* (refer to Fig. 9) – similar to electricity tariffs where one fee component is charged for using the network and another for the kWh actually consumed.

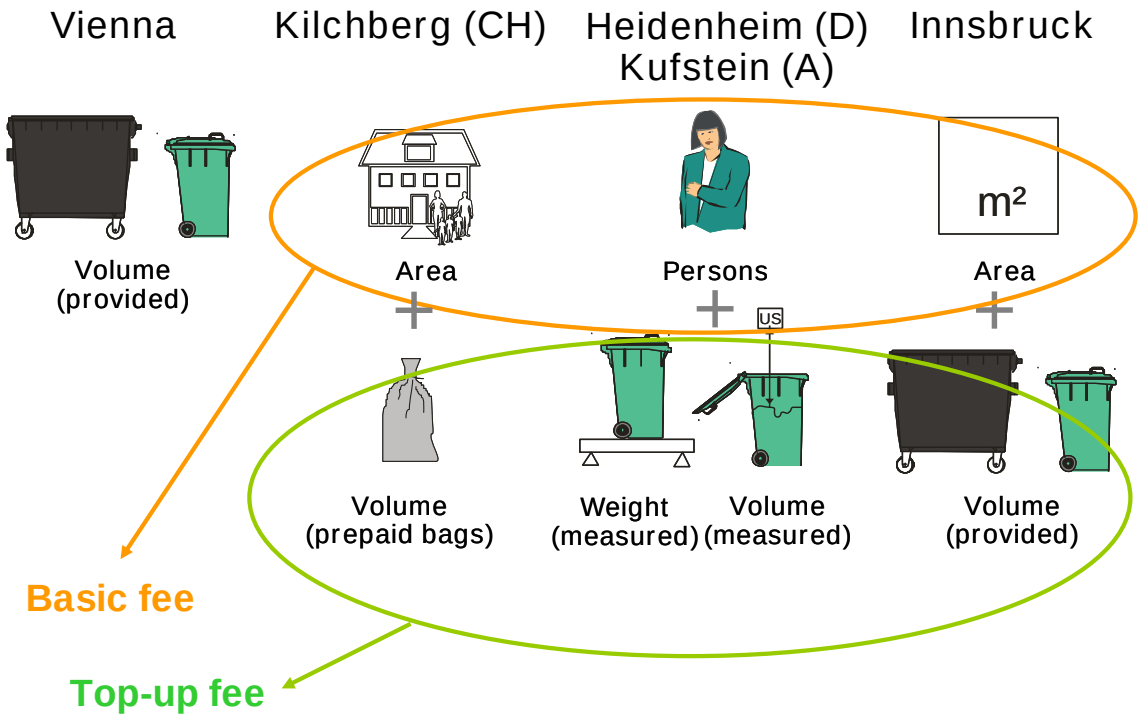

Fig. 9: Five examples for fees, four of which have been separated in to a basic fee and top-up fee

5.6 Citizens´ behaviour and steering effects

When designing a waste management fee its possible *steering effects* have to be taken into consideration. It may happen that people try to avoid paying a fee, or try to pay a lower fee if there are possibilities to do so.

Example: If the fee is based fully or to a high extent on waste quantity, meanwhile there is no charge for taking residual MSW to a recycling station, some people will bring waste to the recycling station thus reducing their fee.

One question that is often discussed is if the separate collection of biowaste should be covered by an extra fee, or be included in the fee paid for the management of residual MSW.

It is recommended that the separate collection of recyclables as well as hazardous waste is not financed by an extra fee. It should be financed by the fee paid for residual MSW. Instead what is required is that a quality assurance system is established ensuring that bins for recyclables (without a fee) are not misused. If bins for recyclables continue to be misused at certain addresses and respective information efforts are without success, these bins should be replaced by bins for residual MSW. Then the fee on these addresses should be raised. In this way the misuse brings a

disadvantageous for the people living there – realizing this disadvantage might represent a final invitation to “behave properly”.

Summarizing it can be stated:

- The steering effect of fees concerning waste minimization / separate collection altogether is a limited one
- Nevertheless the fee system should contain elements which awards desired behaviour with a financial incentive
- Avoiding payment of fees often takes places within the fee system of the very same municipality (usually MSW and bulky waste and/or recyclables).

Example of one (Austrian) municipality:

- Two times per year collection of bulky waste from the streets – without fee
- Delivering bulky waste to a collection site – fee EUR 8,- per m³

Effect:

- „Mountains“ of bulky waste to be handled by the collection service
- High cost

Fig. 10: Example of a fee steering into a direction which becomes expensive

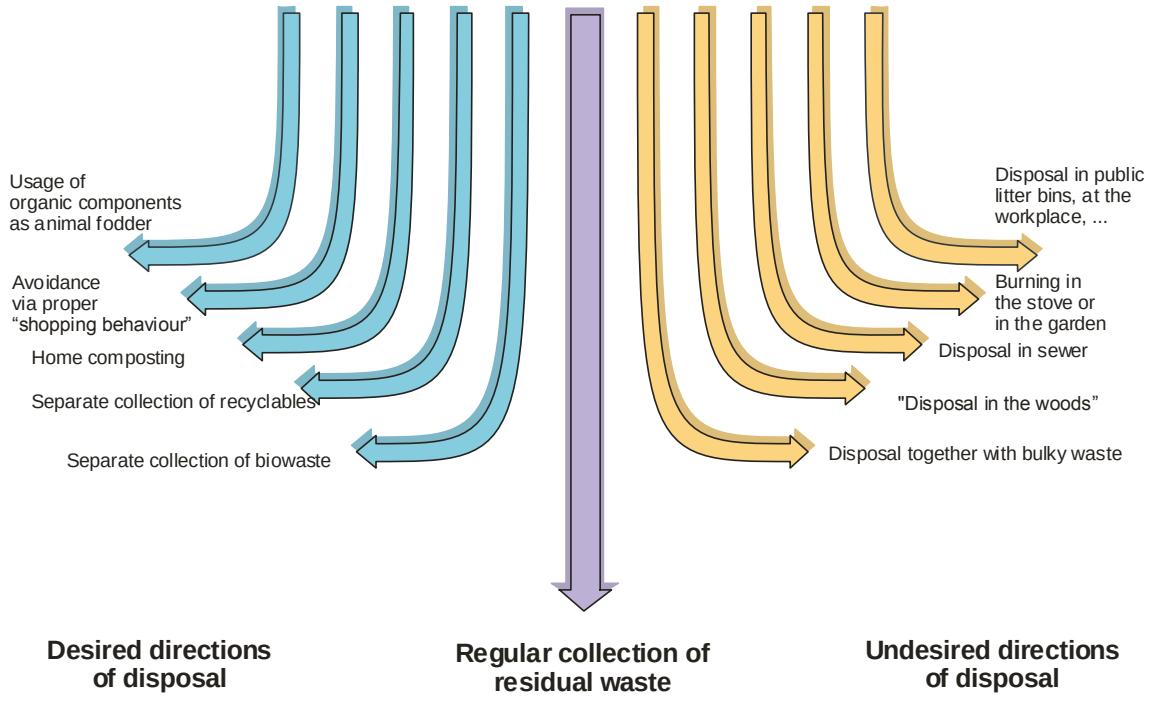

Fig. 11: Desired and undesired "disposal directions"

5.7 Influence of the competent authority in the development of municipal waste management

A uniform organization of waste management within a municipality or a region can only be secured if there is one single entity to which the entire responsibility is awarded. This responsible entity has to have the overview and the responsibility for all interfaces between different tasks of waste management like

- public awareness ⇔ collection system
- collection system ⇔ waste treatment
- definition of collected separately products ⇔ recycling methods, etc.

It is recommended that the municipality should represent the responsible body for setting as well as collecting waste management fees, as all activities are connected with the issue "fee". Beyond the waste management fee it is open as to who performs the operational activities – however in any case this should be under the general responsibility of the municipality.

Experience has shown that a lot of problems occur when waste management fees are collected by private companies:

- Payment losses are typically higher when the fee is collected by a private entity rather than when the municipality is the fee collector (due to a question of *assertiveness* which is usually higher for a public entity)
- Administrative work of the municipality may not be acknowledged and therefore not financed by the waste management fee
- Related services like separate collection of recyclables, separate collection of hazardous waste, collection of bulky waste, street cleaning from littering, public relation activities will not be financed by the waste management fee
- Securing a waste management service for each single property becomes difficult with some “cherry picking” of the private collector who, when being confronted with payment problems, understandably will concentrate on affluent and commercial areas
- There is a risk that a private collector will stop its service to users that default on their payments. The municipality is then obligated to secure the service to the defaulter(s) to avoid them dumping their waste elsewhere.

5.8 How to handle companies

Commercial waste generators (in this guideline referred to as “companies”) do not always require all services offered to households, with collection of bulky waste or hazardous waste as an example. So it may happen that the fee calculated for private households is higher than the “market price”, i.e. the price a company could be offered by a collector who has to account for the required service only. If a separate fee is calculated for companies concerning only the services the company requires, the fee will often be attractive compared with that offered by private collectors (focussing on commercial waste only), as the municipality operates over a larger area with close distances between collection points. By combining two types of waste generators (e.g. residential and commercial) a cost-efficient collection can be realized.

It is recommended to offer companies a fee which considers only the services which are needed and used by the company. The lower fee for companies can be explained to private households very clearly with reduced efforts.

Integrating the management of commercial waste into municipal waste management helps municipalities receive a contribution to the fixed costs. Consequently the average cost can be shared, and reduced.

- Some services of the municipality are not required by commercial generators
  - Taking collection bins from the houses
  - Bulky waste
  - Biowaste
  - Special Waste like WEEE, construction waste, hazardous waste, …

- If there are no fees which reflect the lower efforts for companies, the fee for companies becomes too high and less competitive

Fig. 12: Special fee for companies

6 WHO SHOULD COLLECT THE FEE?

It is highly recommended that the fee is collected by the municipality:

- Fewer defaults on payments
- Financing of public sidework can be secured
- Secures waste collection from each facility
- Secures the same price for everybody, even those from remote areas
- Secures a uniform waste management system in an area

Why not the private sector (private companies)?

- It is so much easier to dispose of waste "illegally" (i.e. without paying a fee) than receiving goods or services without payment (water, electricity, telephone)
- Securing that each waste generator has a waste management contract is difficult
- Securing that each waste generator receives an affordable contract is difficult
- The public sector would loose influence on the way waste is managed
- More legislation as well as execution is needed, especially for target-based legislation, e.g. the EU landfill ordinance

7 HOW TO DESIGN A WASTE FEE - THE TEN COMMANDMENTS

1. **KISS Keep It Simple, Stupid**
   Explaining a waste tariff should take no longer than burning a match from start to finish

2. **The fee model should support the waste generator´s desired behaviour**
   the User Pays principle should be reflected – **but suitably.**

3. **Don´t try to create ultimate fee fairness**
   as such will never be achievable.

4. **Additional costs of sophisticated measurement systems** (with e.g. weighing contents of single waste bins) **are higher than individual savings** – therefore don´t incorporate such systems into the municipal waste fee. Alternatively single residents sharing one collection address may establish such a system privately at their own cost (sharing everything fairly, including the extra costs).

5. **The task "fee collection" needs to be considered totally independent from the task "waste collection", but:** No one other than the public authority should collect the fee.

6. **You should collect one waste management fee only.**
   Separate collection of recyclables, biowaste etc. should not be financed by an extra fee. It is therefore necessary to communicate clearly to the users all of the services that are financed by the fee.

7. **Companies and households require different fees** as they require different services.

8. Height of the fee:
   Don´t mix up affordability with your client´s reluctance to pay for your service.

9. **Ceasing the service** (of waste collection) **does not apply pressure to pay the fee** (as with water supply, electricity, or telecommunication).

10. **It is not an offence to collect the waste fee together with the electricity bill.**

8 EXAMPLE VIENNA

In Vienna collection containers for residual municipal solid waste (rMSW) are located at each property. Collection containers for recyclables are situated partly at the properties and partly at collection points on public places.

As each property has its own container for rMSW, the fee is based on the size of these containers which are emptied weekly as a general rule but more often in special cases if needed. With this fee all other related services like separate collection of recyclables, separate collection of hazardous waste, operation of recycling centers (including the collection of bulky waste), public relation activities and advertising are financed.

Each property has to be connected to the public waste collection. Exceptional properties where no waste is generated– like unoccupied sites – do not need to be connected to waste collection. In special cases companies can organise their own waste collection.

The minimum frequency of emptying is once per week. The smallest container is a 120 L bin. From 2012 the fee is 4.24 EUR per emptying, 220.48 EUR per year. The fee for larger bins is in direct proportion to the size. The fee for a 1,100 L container is about ten times the fee for a nominal 120 L container.

The fee is accounted to a single address (to the owner or the administrator of the property) by the city of Vienna. Any division amongst different owners (e.g. flat proprietors) is arranged by the owners or their administrator by their own means.

In Austria and Germany, municipalities are allowed to collect a fee which is higher than the costs directly attributed to the entire collection and treatment efforts if the surplus income is used for activities related to waste management like street cleaning, funding waste minimisation projects, developing a waste management plan, etc.

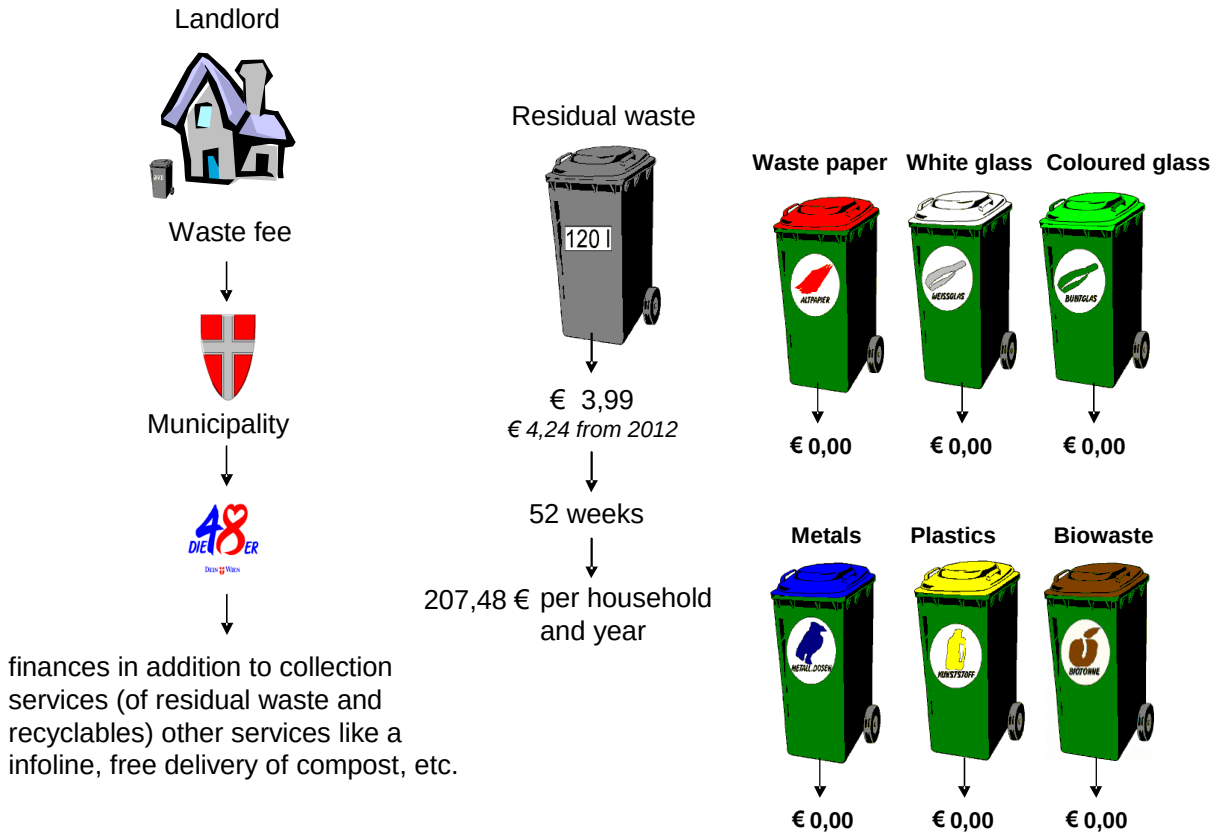

Fig. 13: Vienna´s waste management fee, schematic

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