

ADAPTION POSSIBILITIES OF PAY AS YOU THROW ORDINANCE IN LOCAL ADMINISTRATIVE WASTE MANAGEMENT SYSTEMS IN SCOPE TO REDUCE WASTE ELIMINATION THROUGH LANDFILLING

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Abstract

The present paper describes some of the benefits and challenges associated with implementing the PAY AS YOU THROW system. The PAYT policy has potential to help local officials advance the strategic waste management goals of waste reduction, increased recycling and control of waste disposal costs.

Key words: pay as you throw, cost – benefit analysis, Municipal solid waste, social efficiency

INTRODUCTION

One of the most serious problems of the Romanian environmental protection field is the waste generation in large quantities and their inadequate management. As a member of the European Union, in terms of waste Romania has to fulfill the following objectives:

- To achieve by 2020 a level of 50 % reuse and recycle of paper, plastic, metal, glass from the total amount of household waste
- To achieve a target of 60 % of recycled material from the total packaging waste placed on the national market
- To reach an annual amount of 4 kg/ capita of electrical waste
- To collect separately the biodegradable waste in order to compost or for fermentation
- To reduce the total amount of biodegradable waste with 35 % from landfilling – compared to the level from 1995

According to Eurostat data from 2014 in which differences in the management of municipal waste are shown and treatment strategies are identified based on reported amounts of municipal waste landfilled, incinerated, recycled and composted, in Romania the generated municipal waste kg per person is 254. The treated municipal waste is 213kg/ person. From the treated municipal waste 5 % is recycled, 11 % composted 2 % incinerated and 82 % landfilled. So if in the first 9 and a half years the

recycling rate increased on average by 0.3% per year, in the next 4 years Romania has to implement tools and solutions to increase the recycling rate to almost 12%, a 39 times better performance.

Table 1

Eurostat data showing municipal waste management in Europe

Municipal waste, 2014						
	Generated, (kg per person)	Treated, (kg per person)	Municipal waste treated, %			
			Recycled	Composted	Incinerated	Landfilled
EU*	475	465	28%	16%	27%	28%
Belgium	435	439	34%	21%	44%	1%
Bulgaria	442	416	23%	2%	2%	74%
Czech Republic	310	310	23%	3%	19%	56%
Denmark	759	759	27%	17%	54%	1%
Germany	618	618	47%	17%	35%	1%
Estonia	357	303	31%	6%	56%	8%
Ireland**	586	531	34%	6%	18%	42%
Greece**	509	509	16%	4%	0%	81%
Spain	435	435	16%	17%	12%	55%
France	511	511	22%	17%	35%	26%
Croatia	387	374	15%	2%	0%	83%
Italy	488	455	28%	18%	21%	34%
Cyprus	626	626	13%	12%	0%	75%
Latvia	281	281	3%	5%	0%	92%
Lithuania	433	425	21%	10%	9%	60%
Luxembourg	616	616	28%	18%	35%	18%
Hungary	385	376	25%	6%	10%	59%
Malta	600	545	8%	4%	0%	88%
Netherlands	527	527	24%	27%	48%	1%
Austria	565	547	26%	32%	38%	4%
Poland	272	272	21%	11%	15%	53%
Portugal	453	453	16%	14%	21%	49%
Romania**	254	214	5%	11%	2%	82%
Slovenia	432	257	49%	12%	0%	39%
Slovakia	321	282	6%	6%	12%	76%
Finland	482	482	18%	15%	50%	17%
Sweden	438	438	33%	16%	50%	1%
United Kingdom	482	473	28%	17%	27%	28%
Iceland**	345	345	38%	7%	6%	49%
Norway	423	414	27%	17%	54%	3%
Switzerland	730	730	33%	21%	46%	0%
Montenegro**	508	451	1%	0%	0%	99%
FYR of Macedonia	370	370	-	-	-	100%
Serbia	302	236	1%	0%	0%	99%
Turkey	405	363	0%	0%	0%	100%
Bosnia & Herzegovina	349	234	0%	0%	0%	100%

The treatment operations may not add up to 100% due to rounding.
 Data for the Czech Republic, Germany, Spain, Cyprus, Luxembourg and Poland are estimated and may be revised.
 - : Data not available
 * EU aggregate is estimated based on 2013 data for those Member States for which 2014 data are not available.
 ** 2013 data instead of 2014.
 The source dataset can be found [here](#).

ec.europa.eu/eurostat

MATERIAL AND METHOD

A possible solution for the Romanian waste management is the pay as you throw system. According to law **211/2011**, in order to stimulate the selective collection of household waste, the local public authorities are able to apply the pay as you throw system as an economic instrument wherever it is technically and economically possible.

A pay as you throw system is based on the application of a mechanism by which the user of the waste collection service pays a waste charge according to their real waste generation and the waste management service that is used. The first pay as you throw schemes have had been in operation in the USA since the start of the twentieth century. Subsequently, the scheme began to spread to almost all European countries. It is extremely widespread in Switzerland and the northeastern area of Germany, the north of Italy, Denmark and the Netherlands. Some examples of European cities that have introduced the system are Berlin, Brussels, Munich and Wien.

There are three main types of pay as you throw programs:

- Full unit pricing : users pay for all the waste they want collected in advance by purchasing a tag, costume bag, or selected sized container
- Partial unit pricing: the local authority or municipality decides on a maximum number of bags or containers of waste. Additional bags or containers are available for purchase if the user exceeds the given amount
- Variable rate pricing: users can choose to rent containers of various sizes, with the price corresponding to the amount of waste generated.

Currently in Oradea city, all users pay the same municipal fees regardless the amount of the waste they produce, if they are collecting separately or not. The municipal waste fee is determined by the number of people reported in a household. By using this fix tariffs system there is no incentive to reduce the generated amount of waste.

A study was conducted among the population in Oradea, in 2012 by ECO BIHOR – The ecological landfill operator of Bihor County. The results are given below:

- 1) *Do you know what happens with the waste after they are removed from the storage sites?*
- 2) *Should it be necessary to change the sanitation tax system from the currently practiced system (per person) to a quantified system (in cubic meters)?*

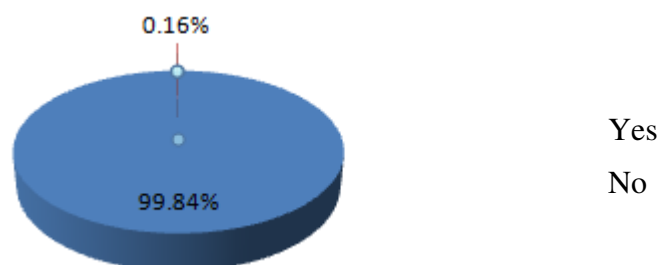


Fig. 1. Results for the first question

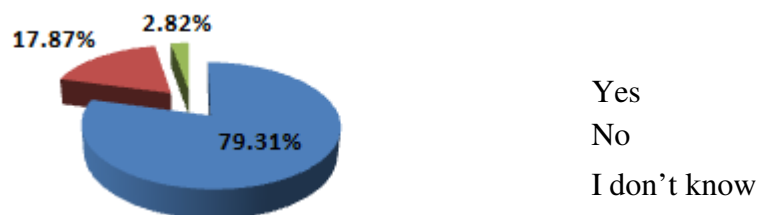


Fig. 2. Results for the second question

3) *Do you know what the dual household waste collection system means? What kind of waste composes the “wet fraction” and the “dry fraction”?*

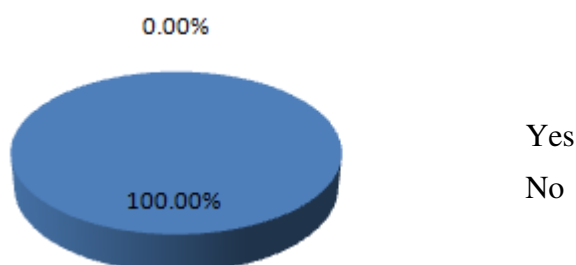


Fig. 3. Results for the third question

4) *What do you think represents a problem for the improvement of the selective waste collection for the population?*

- Lack of information
- Lack of containers with yellow caps
- Too heavy container covers (especially for children and elder people)
- Lack of enclosed systems
- The inadequate frequency of waste collection
- A system of fines for those who do not complain to the law 211/2011
- An incentive system for selective waste collection
- Containers should have different sizes and shapes (round for bottles, glass and metal and narrow long ones for paper and cardboard)

As it can be seen from the results of the study among the population of Oradea there is an interest for the improvement of the waste collection system, as stimulating the selective waste collection system is one of the main ideas outlined.

RESULTS AND DISCUSSION

Implementing the pay as you throw system in Oradea can bring a wide range of benefits to the community.

❖ **Financial benefits**

- Reduced disposal costs
- Reduced operational costs
- Strengthened overall financial health
- Increased revenue from recycled materials
- Increased regional employment in the field of recycling, manufacturing and reuse

❖ **Social benefits**

- Happier residents
- Fairer way to pay for the waste
- High – program approval ratings
- More resources available for other community needs

❖ **Environmental benefits**

- Less natural resource depletion
- Less energy use
- Longer landfill lifespans
- Fewer carbon emissions
- Cleaner, and more organized garbage collection
- Fewer toxins in landfills

Table 2

Simulation of waste collecting fees evolution in Oradea

Oradea	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Waste collecting fees exclusiv TVA/month	4.40	4.44	4.76	5.12	5.22	5.30	6.57	6.68	7.11	7.57	8.05	8.57
Waste collecting fees exclusiv TVA (Euro/year) withouth PAYT	11.74	11.83	12.69	13.66	13.91	14.13	17.53	17.82	18.96	20.18	21.47	22.84
Simulation of waste collecting fees exclusiv TVA (Euro/year) with PAYT								17.82	16.69	17.76	18.89	20.10

For a better understanding of the possible effects of implementing the pay as you throw system, in the table below was performed a simulation of the evolution of the municipal waste collecting fees in Oradea, assuming similar development fees as found in France, in places which have implemented the pay as you throw system. Official data sources lie at the basis of this study:

a) Agence de l'environnement et de la maitrise de l'Energie (Environment Agency and Energy Management in France)

- b) Sustainable Development Department of the French Government
- c) Eurostat database

According to official data from EUROSTAT, Romania is on the last positions among European countries in terms of recycling or composting the municipal waste.

Assuming the implementation of the pay as you throw instrument will be at least as successful in Romania as it is in France, by implementing this system we can achieve the reduction of the total amount of waste with 48% compared to the initial period.

Table 3a

Simulation between the amounts of waste in Romania and France

Avarege evolution :	0.52	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Quantities of collected waste in ROMANIA without PAYT (Kg/capita/year)		383	396	391	411	381	313	259	252	254	251	249
Quantities of collected waste in ROMANIA with PAYT (Kg/capita/year)		0	0	0	0	0	0	0	0	254	131	129
Evoluion from year to year		110%	103%	99%	105%	93%	82%	83%	97%	101%		
Quantities of collected waste in FRANCE without PAYT (Kg/capita/year)		530	536	543	541	535	533	538	523	517	509	
Evoluion from year to year		102%	101%	101%	100%	99%	100%	101%	97%	99%	98%	

Table 3b

Simulation between the amounts of waste in Romania– prediction

Avarege evolution :	0.52	2016	2017	2018	2019	2020	2021	2022	2023
Quantities of collected waste in ROMANIA without PAYT (Kg/capita/year)		246	244	242	239	237	234	232	230
Quantities of collected waste in ROMANIA with PAYT (Kg/capita/year)		128	127	126	124	123	122	121	119

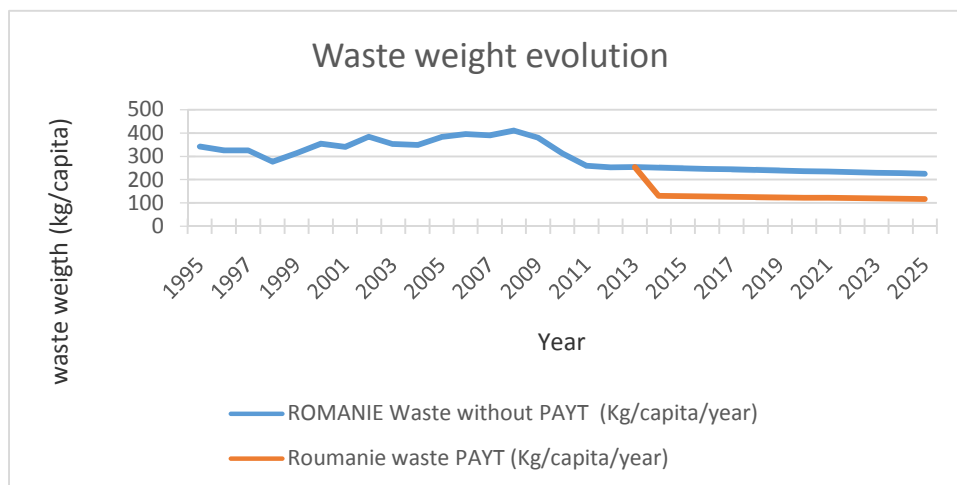


Fig. 4. Simulation of the quantities of waste collected in Romania after implementing the PAYT system

CONCLUSIONS

To achieve the targets assumed by Romania until 2020 all Local Authorities have to implement realistic, innovative and sustainable solutions with reduced environmental and social impact. Zero waste is more than simple recycling.

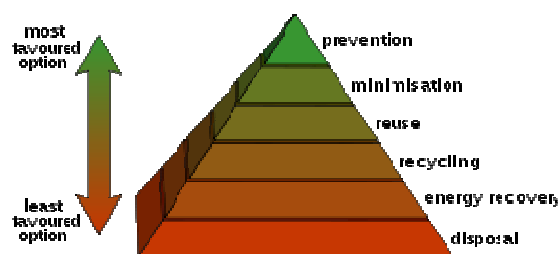


Fig. 5. Waste hierarchy

As the local authorities in Romania will take account of the Ordinance nr.68/12 October 2016, amending the law nr. 211/2011, in Oradea, the city which is considered to be a best practice in waste management to other cities by assuming the ambitious goals of zero waste, the first steps were taken but there are many more to follow:

- Awareness and accountability – 70 % of the population in Oradea lives in Housing Associations (flats), where there is a real problem because of the lack of responsibility and quality of the pre collected waste
- The application of coercive measures (warnings and fines given by the local police)

➤ Supporting the formation of Local Groups, involving local citizens, waste management experts, local councilors to participate in the implementation of the solutions recommended

➤ Implementation of measures to prevent waste generation. Reducing the amount of waste can be encouraged by Local Authorities by: supporting the development of repair workshops, not allowing the disposal of once used plastic bags, supporting programs for the sellers for those who sell bulk food, without packaging waste.

➤ Application of financial instruments. The Pay as you throw system assumes 0 waste fees for the recyclable materials. The payment mechanism has yet to be changed from lei per capita to lei per liter. To assume all these targets some other changes have to be made:

- Local legislative changes - changing the city council decision
- Infrastructural changes – distribution of prepaid bags with different capacities, - building and finalizing armored waste collecting enclosures.

After implementing all these solutions it is possible to achieve the target assumed by Romania. The year of 2016 can be considered a very successful year for waste management, all the support was given by the Environment Ministry, but Local Authorities have to live with it. The Pay as you throw system is uniquely suited to increase recycling and waste prevention, it is an important part of an integrated, cost effective solid waste system. In conclusion, an outlook on the further potentials and propagation of the pay as you throw scheme is given. In the following years, by working together, with responsibility, awareness we can achieve a clean city, country, and by all means, a cleaner world.

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