February 2014

EXECUTIVE SUMMARY

IMPLEMENTING A DEPOSIT AND RETURN SCHEME IN CATALONIA

ECONOMIC OPPORTUNITIES FOR MUNICIPALITIES

RETORNA
FUNDACIÓ PER LA PREVENCIÓ DE RESIDUS I CONSUM RESPONSABLE

RETORNA

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1. INTRODUCTION

Within the context of the campaign in favour of a deposit and return scheme for a series of beverage containers (DRS), the Foundation for the Prevention of Waste and Responsible Consumption was commissioned by Retorna the study of the integrated costs incurred by municipal councils in managing packaging containers – particularly beverage containers – as well as an analysis of the potential for reviewing and resizing the services along with the potential economic savings that the implementation of such a DRS would entail.

The starting hypothesis is that the implementation of a DRS would reduce both the weight and the volume of the waste being currently managed by municipalities (including selective collection, undifferentiated waste and street cleaning). This reduction would mean a decrease in both waste collection and treatment costs.

The purpose of this study has been to respond to the need to concretize to what extend the implementation of a DRS by Catalonian local authorities would result in cost reductions and diminished income.

SCOPE

This study has assessed the impact of the implementation of a DRS in the different domains covered by local authorities regarding waste management:

- Collection costs
- Treatment costs
- Waste disposal tax return
- Street cleaning
- Beach cleaning

PROPOSED MODEL

This study has taken as a reference a deposit and refund schedule (DRS) that would be applied to tin, plastic, glass containers, and tetra cartons used for packaging water, beer, juices and soft drinks (including energy and slush drinks). These are the most popular drinks, especially outside the home and in the catering industry, and precisely because of this they are the ones that are less often selectively collected nowadays.

As to the amount of the deposit, a deposit of ten cents of euro per container would be enough to ensure a return of 85% of containers. This would treble the current levels of selective collection for this type of packaging.

TABLE 1

Products	Water, beer, juices and soft drinks
Containers	Cans, plastic and glass bottles, cartons
Amount of the deposit	10 cent (€)
Level of return	85%

Source: *Compiled by the authors*
TABLE 1: Model of the packaging return scheme for Catalonia

2. METHODOLOGY

COMPILATION OF ECONOMIC DATA

In order to calculate the collection and treatment costs of waste materials complete data have been obtained from 24 local authorities that account for 32.5% of the whole of the population of Catalonia with territorial representation of every Catalonian demarcation regardless of population size (rural, semi-urban and urban environments). This sample is also representative of the diversity of waste collection systems (surface containers, underground containers, door-to-door), processing types and treatment costs, as well as of a variety of levels of generation and selective collection.

As to payment to the SIG, several real invoicing data have been used from both Ecoembes and EcoGlass. In some municipalities, as real, disaggregated data were not available, data have been obtained from the simulator developed by the Agència de Residus de Catalunya (ARC) [Waste Agency of Catalonia].

As regards the collection of data for street cleaning, as well as the data from the surveyed municipalities, other sources have been used such as the budget allocation for street cleaning of other municipalities to expand the scope of the sample. Finally, data from 31 local authorities have been obtained that account for 44.7% of the population of Catalonia.

DESCRIPTIONS

In order to estimate the economic opportunities that are included in this study, it has been necessary to determine the amount of materials that, on the basis of current management flows, would represent the materials included in the DRS. To this end, descriptions have been made for the main flows of packaging containers

under the deposit scheme: light packaging, undifferentiated waste, litter bins and beaches. In spite of not being a major destination for these packaging containers, the organic fraction was also described because of the consequences that the presence of packaging has on contaminant waste and at the same time on the cost of treatment of the waste disposal tax return. A total of 27 descriptions of waste were made in seven municipalities.

In the case of glass, and in order to estimate what percentage of these containers over the total of glass collected corresponds to packaging, the data of the consultant company Canadean have been taken into account. These data indicate that 45.21% of glass containers in the market correspond to water, soft drinks, juices and beer.

3. MAIN RESULTS

WEIGHT AND VOLUME OF CONTAINERS IN WASTE

In the non-selective collection flows (undifferentiated waste, litter bin/streets and beaches) it has been determined that packaging containers in the broader sense1 account for at least 30% of weight and over 69% of volume in every case.

This is particularly relevant in the collection of undifferentiated waste, where containers take up 76 % of volume. In other words, three fourths of the cost of collection costs for undifferentiated waste corresponds to containers that were not selectively collected.

Finally, packaging containers account for 80% of the volume of waste collected from beaches. This data is consistent with those reported in other studies.

TABLE 2

	Undifferentiated	Packaging	Litter bins	Beaches	OFMSW
Weight	31,37%	78,67%	36,84%	51,18%	7,23%
Volume	76,16%	93,45%	69,46%	80,57%	21,09%

Source*: Compiled by the authors*
TABLE 2: Percentages of packaging containers in the different fractions

As to containers subject to the take-back scheme, they represent a major part of general waste and account for over 30% of the volume of total packaging in

every fraction with the exception of undifferentiated waste and OFMSW, where they account for 25% of volume while their weight ranges between 18 and 30% as a function of fraction type.

TABLE 3

	Undifferentiated	Packaging	Litter bins	Beaches	OFMSW
Weight	5,73%	24,90%	19,65%	30,88%	2,76%
Volume	19,52%	42,95%	34,88%	41,37%	11,12%

Source*: Compiled by the authors*
TABLE 3: Percentages of packaging containers under a DRS in the different fractions

Another fact drawn from the descriptions is the percentage of DRS containers in each fraction. The highest percentage corresponds to PET, where 65.24% of weight and 78.81% of volume is subject to the tack-back scheme. At the other end of the spectrum is HDPE, which does not even account for 1% of the weight of the material. Metals would account for 40% while carton would be short of 20%, also in weight.

TABLE 4

	Weight	Volume
PET	65,24%	78,81%
HDPE	0,90%	1,77%
Brick carton	17,85%	13,97%
Steel	41,20%	55,28%
Aluminium	42,81%	62,46%

Source*: Compiled by the authors*
TABLE 4: Percentages of the main materials under a DRS

Finally, an estimate has been made of the market price of packaging waste from the makeup of undifferentiated waste yielding an amount of 80 million euro.

TABLE 5

	tonnes	€/tonne	Total (€)
PET	73.043	300	21.912.964
HDPE	25.145	300	7.543.492
Film	281.666		
Brick carton	26.215	25	655.377
Steel	67.485	350	23.619.803
Aluminium	19.793	600	11.875.783
Paper/cardboard	95.206	90	8.568.563
Glass	126.011	50	6.300.540
Total	**714.564**		**80.476.522**

COSTS

Collection

An analysis of collection shows that the collection costs corresponding to differentiated waste are not covered by integrated management system. In the case of glass, coverage is below 60% while in the case of light packaging it is short of 85%. Furthermore, the full cost of undifferentiated waste is fully defrayed by local authorities, with an average cost of 84 €/tonne.

TABLE 6

€/collected tonne	Light packaging	Glass	Undifferentiated
expenses	310	90	84
income	257	54	-
Coverage percentages	**82,88%**	**60,12%**	-

Treatment

In the calculation of costs, the data provided by ARC corresponding to the weighted cost for each type of treatment were used. Using the weighted average cost price of landfill treatment, namely 59.85 euro/tonne (table 7) the total treatment cost is at € 136,149,554.

TABLE 7

	MBT	Controlled deposit	Incineration	Total
tonnes	1.128.416	883.805	262.527	2.274.748
cost/ton.	67,00	54,63	46,70	59,85
total cost	**75.603.872**	**48.285.671**	**12.260.011**	**136.149.554**

Source: *Agència de Residus de Catalunya*
TABLE 7: weighted cost of the undifferentiated waste fraction at final treatment (waste tax included)

Packaging containers amount to 31.37% of the total weight of undifferentiated waste and therefore their treatment cost is at €38,802,798 while waste disposal tax is at €3,907,317, which makes a total of €42,710,115. Of these, 7.8 million would correspond to containers under the DRS.

According to data provided by ARC, the organic fraction of municipal solid waste (OFMSW) has a weighted average cost of 62.7 euro/tonne2. This meant a total expenditure of €24,085,333 in 2012. The costs incurred by the presence of packaging containers were at €1,741,613, of which 664,755 would correspond to containers under the DRS.

4. IMPACT OF THE IMPLEMENTATION OF A DRS

COLLECTION

In the case of the collection of waste, the implementation of a DRS would have important emptying effect on waste bins that would entail a major readjustment in collection frequencies as well as reduction in the amount of waste collected.

On the basis of the collection frequency data compiled, it has been determined that there would be a reduction of one day per week in the light packaging and undifferentiated waste fractions while in the case of glass collection frequency would be halved. There would be no reduction in the organic fraction as in this case frequency is determined by the need to minimize smells resulting from decomposition processes.

This reduction in frequency would result in a reduction in costs that would lead to a resizing of the service or to allocate the newly available resources to other services within the contract of services.

In the municipalities where the payment of waste collection service is dependent on the number of tonnes collected the reduction would be direct and immediate.

A total of between 12 and 33 million euro could be saved, the latter figure being the most likely as most municipalities work on a pay-per-service basis (See Table 8).

TABLE 8

Collection savings	Weight	Service
Light packaging	1.269.184	4.143.800
Glass	1.756.928	2.066.974
Undifferentiated waste	9.278.072	26.843.565
Total	**12.304.185**	**33.054.339**

Source*: Compiled by the authors*
TABLE 8: Quantification of the cost of collecting packaging containers subject to DRS

TREATMENT

The implementation of a DRS would entail a reduction in the amount of waste admitted to final treatment plants. The treatment costs of the waste that would fall under a DRS have been estimated at €6,636,856 distributed among every final treatment.

The removal of part of the containers from the mechanical-biological treatment and incineration cycles would result in changes to the costs of these treatments but an estimation of these changes has not been possible as access to the agreements regulating the payments and assessments made by SIG has not been granted.

As to composting, the cost of contaminated waste that would fall under a DRS scheme and that currently end up a composting or methanisation is estimated at €565,042.

TABLE 9

Treatment savings	€
Final treatment	6.029.686
Waste Disposal Tax	607.170
OFMSW	565.042

Source*: Compiled by the authors*
TABLE 9: Quantification of final treatment costs of packaging containers subject to a DRS

RETURN OF THE WASTE DISPOSAL TAX

As to the return for selective collection of OFMSW, the implementation of a DRS would have a significant impact. The quality coefficient would increase from an average of 1.78 to 1.93 and this would mean that local authorities would receive €1,105,523 as return of the collection fee.

STREET CLEANING

Catalonian municipal councils spend €266 million in street cleaning. A large proportion of this cost is attributable to packaging whether dumped or in litter bins.

The implementation of a DRS would result in a reduction in the frequency of litter bin emptying, thus leading to an improved efficiency of street cleaning teams. Taking a conservative approach in the estimation of the impact of a DRS it has been considered that it would only have an impact on manual street sweeping services.

From the surveys made to street cleaning workers, it has been considered that the efficiency of manual street sweeping would increase by 10%, which would mean potential annual savings of €13,175,737 from the 170 million that this service costs.

It should be underscored that in this estimate the cleaning of cultural, sports, educational and public transport areas or parks and gardens have not been considered. Therefore, the estimated savings are fairly conservative.

BEACH CLEANING

In order to calculate the expenditure on beach cleaning, we have looked at a number of municipal budgets from an extensive sample of coastal municipalities and from there the total cost for Catalonia has been estimated.

Like in the case of street cleaning, with the implementation of a DRS many of these packaging containers would not end up on the sand or in litter bins and the service could be resized. Regarding the services provided by beach cleaning teams, the implementation of this scheme would affect litter bin emptying and litter picking.

In the case of litter bin emptying, its impact would be significant as 35.16% of the volume of waste would disappear. This could result in a review of litter bin emptying frequencies or a reduction of the teams providing this service. For beach cleaning, the same principle as applied to manual street cleaning has been followed: a reduction in the most visible waste could entail an increase in the efficiency of cleaning teams that would be estimated at 10%. This increase in efficiency translates into €580,481.

5. CONCLUSIONS

The management of packaging in Catalonia represents an annual net cost in excess of €215 million. Furthermore, the budget of ECOEMBES adds another 67 million and Ecovidrio some 12 further million as far as Catalonia is concerned. In total, the management of packaging containers amounts to €295 million and the integrated management systems only pay 27%.

Incinerating or landfilling packaging containers costs €18,993,181, of which over 90% is borne by the members of the public and not by packers.

Over 75% of the volume occupied by undifferentiated waste was packaging containers that should have gone to selective collection (yellow, green and blue bins).

The presence of packaging containers that would fall under a DRS in the collection and treatment flows are most reliably estimated at over €56 million. This amount is equivalent to almost 20% of the cost of packaging container management in Catalonia.

TABLE 11

Collection	Less likely	More likely
Light packaging	1.269.184	4.143.800
Glass	1.756.928	2.066.974
Undifferentiated waste	9.278.072	26.843.565
Waste disposal tax return		
Collection	1.105.523	1.105.523
Treatment		
Final treatment	6.029.686	6.029.686
Waste disposal tax	607.170	607.170
OFMSW	565.042	565.042
Costs resulting from cleaning		
Streets	0	13.175.737
Beaches	0	1.616.133
Total (including cleaning)	**20.611.606**	**56.153.630**

Source*: Compiled by the authors*
TABLE 11: Gains derived from the implementation of a DRS in Catalonia

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