

# MUNICIPAL SOLID WASTE PROJECT: IMPLEMENTATION OF “DOOR TO DOOR” COLLECTION AND “PAY AS YOU THROW” TARIFF IN THE PROVINCE OF GROSSETO



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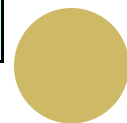
# INTRODUCTION

The current situation:

-The average production of waste is 717 kg/inh/year

-The area has some particular morphological characteristics that made it until now difficult to implement any strategy that aims to reach higher differentiating objectives.

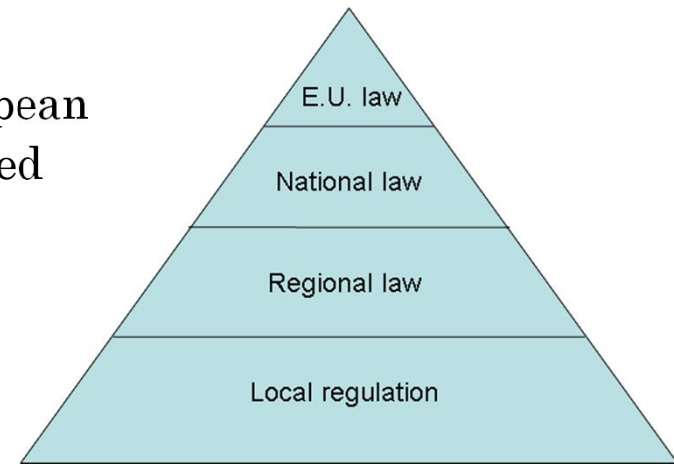
Region	Regulation authority	Province	Municipalities (number)	Population
Toscana	ATO Nord			
	ATO Costa			
	<u>ATO Sud</u> <b>(35% Separate Collection=Sc)</b>	Siena	36	
		Arezzo	39	
		<b>Grosseto</b> <b>(29% SC)</b>	<b>28</b> <b>(27,2%)</b>	<b>225.861</b> <b>(26,7%)</b>



# Regulation and framework of the sector

## ○ Waste regulation (environmental law and policy)

- The Treaty on the Functioning of the European Union established that environment is a shared competence between the E.U. and the M.E.
- Directive 2008/98/EC of the E. P. and the Council of 19 November 2008 on waste and repealing certain Directives.
- Legge Comunitaria 2008 [Legge 7 luglio 2009, n. 88]. This implementation required the revision of the law DL152/2006 on Environmental Norms
- L.R. 22 novembre 2007, n. 61, modifiche alla legge regionale 18 maggio 1998, n. 25 (Norme per la gestione dei rifiuti e la bonifica dei siti inquinati) e norme per la gestione integrata dei rifiuti.



# Regulation and framework of the sector

## ○ Competition law and policy

- The framework is the Treaty on the Functioning of the European Union in reference to state aids (Art. 106 and 107)
- The “Services of general economic interest” (SGEI) are economic activities that public authorities identify as being of particular importance to citizens and that would not be supplied (or would be supplied under different conditions) if there were no public intervention (Altmark case)



# Description of the project

## ○ Objectives

- To increase the sorting level to 65% in 4 years
- Reduce by 15% the waste production in reference to year 2004 (741,9 kg inh/y)
- To decrease 20% the amount that goes to landfills in reference to year 2004.

## Who:

- “Maremma Servizi”. It will be a mixed public-private capital companies (PPP)
  - 51% Consortium of all the municipalities (suggested by Regional law: 61/2007)
  - 49% Private



# Description of the project

## ○ How

<b>DOOR TO DOOR SYSTEM</b>	
<b>Volume</b>	<b>Weight</b>
<ul style="list-style-type: none"> <li>○ Bins</li> <li>○ <u>Sacks / stickers</u></li> <li>○ Bar code</li> <li>○ Street bins</li> </ul>	<ul style="list-style-type: none"> <li>○ Bins + chips + weighting trucks</li> <li>○ Weighting containers</li> </ul>

<b>“PAY AS YOU THROW” TARIFF</b>	
<b>All variable</b>	
<ul style="list-style-type: none"> <li>○ fixed price for bin</li> <li>○ variable price with reference to the dimension</li> </ul>	<ul style="list-style-type: none"> <li>○ Price with reference to weight</li> </ul>
<b>Fixed + variable</b>	
<ul style="list-style-type: none"> <li>○ <u>Two level: fixed + fixed price for bin</u></li> <li>○ Multi level: fixed + variable price for bin</li> </ul>	<ul style="list-style-type: none"> <li>○ Multi level: fixed + variable price for bin</li> </ul>





# Methodology

- In order to assess the financial viability of our project, we computed for:
  - the profit and loss
  - the cash flow following the standard accounting method and further derived industrial financial NPV
  - the BEP tariff



# Key results (1)

YEAR	1	2	3	4	5	...	10
Urban Waste (tonnes)	161942,337	153845,2	144614,5	134491,49	134491,49	...	134491,49
Separate Waste (tonnes)	45343,85436	61538,09	72307,25	78005,065	78005,065	...	78005,065
Residual Waste (tonnes)	116598,4826	92307,13	72307,25	56486,426	56486,426	...	56486,426
						...	
Variable part for tariff (€/fam)	75	60,5625	48,38944	38,557865	30,152251	...	33,290521
Fixed part for tariff (€/mq/fam)	1,45	1,479	1,50858	1,5387516	1,5695266	...	1,7328842
Total tariff (€/fam)	220	208,4625	199,2474	192,43303	187,10491	...	206,57894
Unit price of recyclable sold (€/ton)	22,10583	22,54795	22,99891	23,458884	23,928061	...	26,418513
						...	
<b>REVENUES</b>						...	
Revenues from variable part (sale of sacks)	5646525	4559569	3643096	2902906	2270072,5	...	2506343,5
Revenues from tariff (fixed component)	109166,15	111349,5	113576,5	115847,99	118164,95	...	130463,65
Revenues from sale of recyclable waste	1002363,536	1387558	1630380	1758854	1758854	...	1758854
<b>Total revenues</b>	<b>6758054,686</b>	<b>6058476</b>	<b>5387052</b>	<b>4777608</b>	<b>4147091,5</b>	...	<b>4395661,2</b>
						...	
<b>COST OF EMPLOYEES</b>	<b>2494000</b>	<b>2576302</b>	<b>2656031</b>	<b>2728482,3</b>	<b>2810336,8</b>	...	<b>3257950,5</b>
Cost of employees: fixed costs (90%)	2244600	2244600	2311938	2381296,1	2452735	...	2843392,1
Cost of employees: variables costs (10%)	249400	331702	344093,4	347186,15	357601,74	...	414558,42
cost of employees: unit cost (Euro/tonne waste)	1,540054347	1,540054	1,586256	1,6338437	1,682859	...	1,9508948
						...	
<b>RAW MATERIAL</b>	<b>495990,756</b>	<b>462714,7</b>	<b>435693</b>	<b>415137,02</b>	<b>398567,67</b>	...	<b>440050,91</b>
Annual investment for recyclable waste	252964,32	258023,6	263184,1	268447,76	273816,72	...	302315,78
Residual waste sacks	203274,9	164144,5	131151,4	104504,62	81722,61	...	90228,364
Annual stocks for initial kit (2%)	32162,6064	32805,86	33461,98	34131,215	34813,84	...	38437,292
Annual stock of sacks for recyclables (3% of annual inv_sacks)	7588,9296	7740,708	7895,522	8053,4328	8214,5015	...	9069,4734
						...	
<b>OTHERS O&amp;M COSTS</b>	<b>12143396,97</b>	<b>9832920</b>	<b>7733347</b>	<b>6175699,8</b>	<b>6177725,7</b>	...	<b>6192362,5</b>
Disposal cost	11659848,26	9415327	7375340	5761615,5	5761615,5	...	5761615,5
Fuel	115411,2	117719,4	120073,8	122475,29	124924,79	...	137927,07
Extraordinary & Machinery Maintenance	0	0	0	99642,857	99642,857	...	99642,857
Other general expenses	368137,5066	299872,8	237933,2	191966,12	191542,52	...	193177,09
						...	
<b>GROSS PROFIT (A+B+C-D-E-F)</b>	<b>-8375333,041</b>	<b>-6813460</b>	<b>-5438019</b>	<b>-4541711</b>	<b>-5239538,6</b>	...	<b>-5494702,8</b>
						...	
<b>DEPRECIATION (see spreadsheet "depreciation")</b>	<b>409485,232</b>	<b>443364,4</b>	<b>465950,5</b>	<b>465950,48</b>	<b>465950,48</b>	...	<b>465950,48</b>
						...	
<b>OPERATING PROFIT (A+B+C-D-E-F-G)</b>	<b>-8784818,273</b>	<b>-7256825</b>	<b>-5903970</b>	<b>-5007661,5</b>	<b>-5705489,1</b>	...	<b>-5960653,3</b>
						...	
<b>TAXATION (37% OF OPERATING PROFIT)</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	...	<b>0</b>

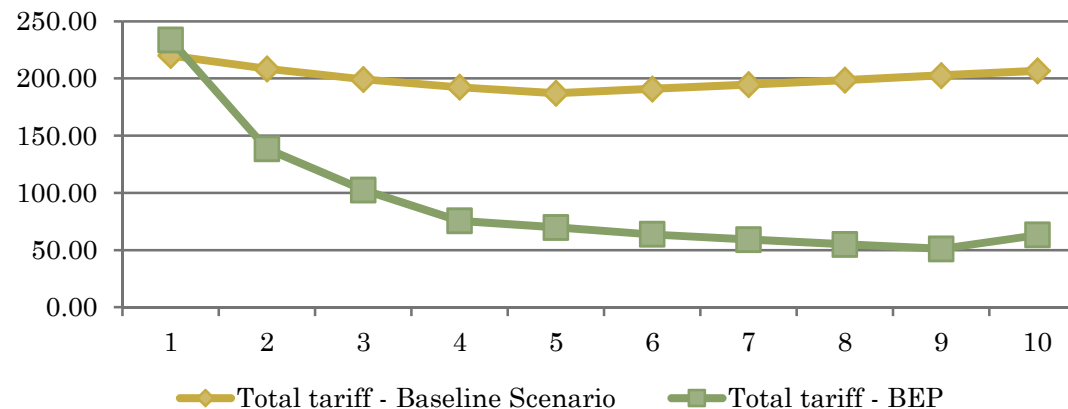
## Key results (2)

Table: NPV

<b>INDUSTRIAL OPERATION</b>	<b>€</b>
NPV	-40.337.077,67
<b>FINANCIAL OPERATION</b>	
NPV	203.648,36
<b>TOTAL NET PRESENT VALUE</b>	<b>-40.133.429,31</b>

# TARIFF

Tariff is calculated based on the overall costs (fixed and variable) divided by number of families.



In order to achieve the financial equilibrium, the new tariff is higher than baseline scenario one, for the first year (234€/fam/yr with respect to 220€/fam/yr), and then, it decreases. This trend shows how a tariff allows the transition from a static system, based on treatment system supply, to a dynamic one, based on demand, in which collaboration in sorting is linked to the tariff structure and level.

# ECONOMIC IMPACT

**Table: Socioeconomic Impacts Matrix**

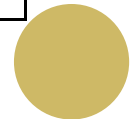
Potential Impact	Value	Impact Assessment		
		High	Moderate	Low
Employment benefits	80 persons			
Provision of new service				
Community satisfaction towards waste collection				
Impacts on current solid waste system				
Direct expenditures in local, national and global levels (operating costs)	90,000,610 during 10 yr			
Indirect expenditures in both local and national levels				
Investments opportunities	4,081,300 capital Inv.			



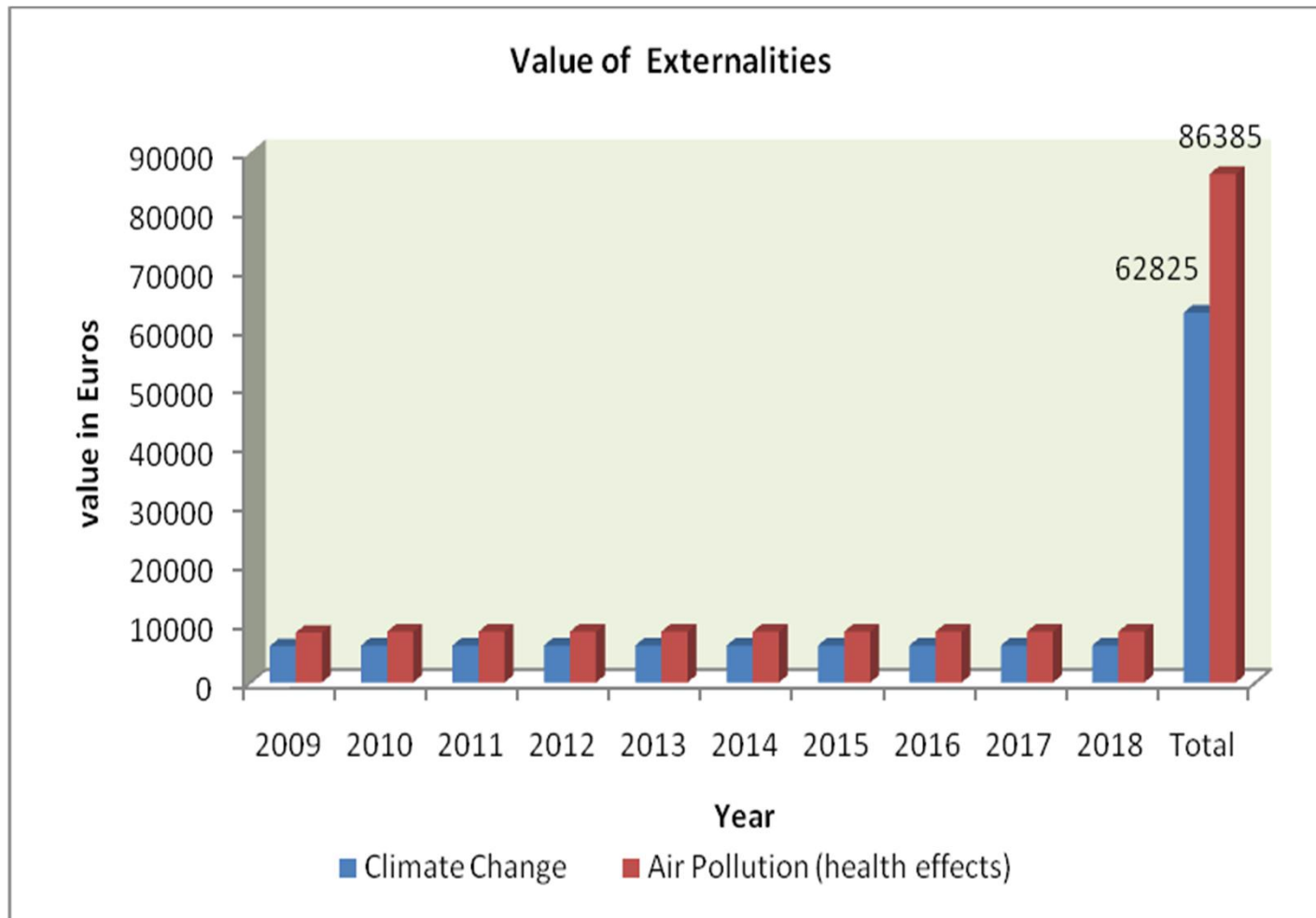
# Environmental impact assessment

**Table: Door-to-Door Project Externalities Matrix (During the period of 10 years)**

Potential Impact	Value	Impact Assessment		
		High	Moderate	Low
Environmental damage (climate change only)	€ 62825(10yr)			
Resources use (public roads)	384.714 km/year			
Health risks and risk of accident (air pollution only)	€ 86385 (10yr) 259.682 kg of carbon dioxide pr/yr			
Energy consumption (diesel)	96.179 L/Y			
Social impacts - Negative	-			
Social impacts - Positive	-			



# Environmental impact assessment



# Environmental impact assessment

**Table: EIA Matrix**

Potential Impact	Value / year	Impact Assessment						
		Residual impacts	Significance	Duration	Timing	Extent/location	Magnitude	Nature
Climate change	€ 67.886	Yes	Low	continuous	operation	Global	Low	cumulative
Water quality	-	Yes	Low	intermittent	operation	National	Low	cumulative
Noise	-	No	Low	intermittent	operation	local	Low	direct
Air Quality (Co2) and Health effects	€ 93.343	Yes	Low	continuous	operation	National	Low	cumulative
Use of Infrastructure Facilities (roads )	384.714 km/year	No	moderate	continuous	operation	local	moderate	cumulative
Land Use Effects / visual impact	-	No	Low	intermittent	operation	local	Low	cumulative
Fuel consumption	96.179 L/Y	Yes	moderate	continuous	operation	National	moderate	direct





# CONCLUSIONS

- Saving for citizens
- Financial equilibrium for public operator (BEP)
- Employment impact
- Very optimistic (also unrealistic) scenario, room for improvements in assumptions and data



**THANK YOU**  
**GRACIAS**  
**SHOKRAN**  
**GRAZIE**

