D1.4 Preparatory Actions Report

WP1 Pilots Planning and Execution
FDEUSTO
Report
Public

VERSION	DATE	DESCRIPTION OF MAIN CHANGES	AUTHOR
1.0	2017/11/30	First draft	FDEUSTO, BCN
1.1	2017/12/11	Added additional information about Social Actions	BCN
2.0	2017/12/15	Incorporated suggestions by the revierwes	FDEUSTO
2.1	2017/12/15	Added explanations about project status and deviations	FDEUSTO
2.2	2018/11/30	Including comments from revision	FDEUSTO, BCN

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Glossary

F

FORBI

Biomass product result from the Biomass Treatment Plant (R19).

G

Grant Agreement (GA)

Contractual document signed by all the project partnership which defines the rights and obligations of the Consortium regarding the EC.

Geographic Information Systems (GIS)

Is a system designed to capture, store, manipulate, analyze, manage, and present spatial or geographic data.

K

Key Performance Indicators (KPIs)

Indicator for quantifying the overall impact of the Waste4Think project

P

PAYT (Pay-As-You-Throw)

strategy that allows applying the Polluter Pays Principle for household waste through the implementation of a variable fee structure

S

Sustainability Assessment Model

Waste management chain that involves the following stages in the waste management generation, collection, treatment and final disposal, as well as the definition of the set of the Key Performance Indicators (KPIs) for the evaluation of the impact of the diferent ecosolutions implemented in Waste4think

W

WESTE methodology

set of Key Performance Indicators (KPIs) specifically designed in Waste4Think to holistically assess the efficiency of the system as well as the monitoring of the strategic and operational objectives in each pilot from an economic, environmental and social perspective under a Life cycle approach

Z

Zero Waste Ecosystem

is one entity or group of entities that develop their activity in such a way that minimizes the potential negative impacts on the environment

Zero Waste Event

an event that has been designed, organized and developed with the aim of no generating wastes

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Executive summary

This deliverable summarizes the status of the project at Milestone 2 (month 18 of the project) where Preparatory Actions of the project are expected to be fulfilled. According to the Grant Agreement (GA) the Preparatory Actions comprise the following activities:

"*Coordination of agents external to the project which preparatory actions are required for the deployment of the pilots, such as, permission grants (building permissions, informed consent, etc), purchase and deployment of sensors, informative meetings with the project stakeholders, etc. The baseline of the KPIs for the pilots has been set based on historical data in month 12.*

Monitoring and assessments of the KPIs based on real data."

Annex II. Actions to Carry out for each

Eco-innovative Solution in Every Pilot and Phase

The present deliverable describes the status of the project according to the foreseen status at Milestone 2 in terms of:

- Baseline updates (Section 2): Updates in the baseline data and KPIs have been made in the cases of Halandri, Zamudio and Seveso, as some data have been updated or mistakes in the calculation of KPIs detected.
- Development and implementation of the eco-solutions (Section 3): A revision of the development and implementation status at Milestone 2 in comparison with the planned status has been made. A Story Map based tool has been created in order to visualize the status of the project. The structure of Waste4Think Story Map is explained.
- Social Actions implementation (Section 4): A review of the status of the implementation of the social actions which comprises the environmental programm of the pilots is shown in this Section. The Social Actions Module (the module of the Result R3: Planning Module for the design, planning and monitoring of the Social Actions) and the Social Actions Data Model are explained.
- Monitoring of the Waste4Think KPIs (Section 5):
    - KPIs of the waste management systems of Halandri and Seveso at Milestone 2 have been calculated using the methodology described in Deliverable D1.3. The aim is to evaluate the impact of two important milestones in these pilots: the implementation of a PAYT (Pay As You Throw) scheme in Seveso and the implementation of the organic fraction collection in Halandri, respectively.
    - At this stage of the project KPIs related to the eco-solutions have not been measured due to the early stage of development of the solutions.

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- Lessons learnt (Section 6): main knowledge acquired during this period related to the monitoring of the Social Actions is summarized in this Section.

1 Introduction

Pilots execution progress of the 4 pilot sites in WasteThink (Cascais, Seveso, Zamudio and Halandri) will be analysed along the project by 4 deliverables corresponding to the milestones of the project (Table 1).

Table 1 Relation of Milestones and results reports foreseen for Waste4Think project.

Milestone	Month	Deliverable
M2	18	D1.4 Preparatory Actions Report
M3	28	D1.5 Deployment & Integration Report
M4	34	D1.6 Preliminary Test Report
M5	40	D1.7 Full Test Report

The aim of this set of deliverables is to present the overall progress of the pilots during the project execution summarizing the actions taken as well as the progress made in every pilot with respect to the baseline. In particular, these periodic reports will contain the following structure:

Section 2 Baseline updates. Although the baseline of the pilots is established in D1.3, its updates (if necessary) will be incorporated in these progress reports.

Section 3: A description of the sensors that have been deployed at every pilot site and their location and the state of the technologies to be deployed at the pilot sites.

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Table 2 summarizes the results expected in Waste4Think.

Table 2 Expected results of Waste4Think.

	R1 - Operation & Management Module R2 – Collection Module R3 – Planning Module R4 – Circular Economy Module
	R5 - Food App: Promotion of food waste prevention R6 - Local Trade App: Promotion of local trade, eco- tourism and cooperative actions R7 - Citizen App: Promotion of transparency and citizen empowerment, communication with waste managers.
	R8 – Innovative Teaching Units: Educational materials about waste management. R9 – Sorting Game: Game that teaches on the importance of waste sorting R10 - Eco-design Game: Introduction to the eco-design. R11 – Planning Game: Game to raise awareness and to train on the integral waste management system. R12 – Virtual City Game: Game that provides training on the Circular Economy principles R13 – Eco-Design solutions: Co-creation of eco-products and services. R14 – Planning solutions for the co-creation of integral waste management strategies. R15 – Circular Economy solutions for the co-creation of Circular Economy strategies
	R16 – Economic instruments: Legislation about PAYT and incentive schemes. R17 – Innovative awareness actions: web tolos and awareness campaings. R18 – Best Practices Book
	R19 – Pre-dried and shredded bio-waste (FORBI): Valorisation of kitchen/food waste in a circular economy concept R20 - Bio-fuel: Valorisation ant treatment of nappies for bio-fuel production.

Section 4: A summary of the social actions carried out and their impact.

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Section 5: A review in terms of the KPIs with respect to the project baseline following the sustainability model defined in D1.3, as well as any modification in the KPIs methodology if necessary. Table 3 shows the foreseen scheduling to monitor the waste management KPIs of the pilot sites.

Table 3 Scheduling foreseen for the update of the Waste Management KPIs (where grey cells denote when the KPIs will be updated).

Pilot site	D1.4 Milestone 2 (Month 18)	D1.5 Milestone 3 (Month 28)	D1.6 Milestone 4 (Month 34)	D1.7 Milestone 5 (Month 40)
Cascais	**No significant change of the system**	Change in the collection system (containers and lorries), use of Apps	Preliminay test	Full scale
Halandri	**Biowaste collection in operation**	Educational materials in schools and use of Apps. Nappies collection	Preliminay test	Full scale
Seveso	**PAYT under implementation**	Zerowaste events, virtuousvirtous households and use of Apps	Preliminay test	Full scale
Zamudio	**No significant change of the system**	Change in the collection system (containers and lorries). Educational materials in schools and use of Apps	Preliminay test	Full scale

Section 6: As a result of the assessment of the project progress, each deliverable will also incorporate: the lessons learnt, the updated calendars and recommendations for the coming period (or postproject period in case of D1.7).

This deliverable is directly related to the following deliverables of the project:

D1.1 Pilots planning documentation which includes the legislation framework of the pilots as well as the description of the functional and non-functional requirements of the eco-solutions.

D1.3 Sustainability assessment models with information about the waste management systems of the pilot sites as well as the baseline and the main objectives.

D.4.1 Implementation of R17: non ICT Innovative Social Actions and *D.4.2 Implementation of R17: ICT based Innovative Social Actions* with the detailed environmental programmes of the pilot sites and their scheduling.

D2.7 Technical documentation of R3: Planning Module where Social Actions Module is described.

Finally the public data model of the Social Actions with all the information regarding the implementation of the Social Actions will be available in Waste4Think Zenodo Community when delivery of D1.5..

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2 Baseline updates

During this period, some mistakes have been detected in the baseline template as well as in the methodology followed by some pilots, so that the baselines (included in D1.3) have been reviewed

From Table 4 to Table 7 the updated tables of the KPIs per pilot are shown. In the case of Cascais the methodology followed in the municipality during the characterization was not correct (as can be deducted by the 0% level of impropers). A new baseline will be carried out selecting a near urban area with similar characteristics of the pilot site but out of the influence of Waste4Think project, as the social actions in the pilot site have already started.

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Table 4 Updated KPIs in Cascais baseline

ID Objetives	KPIs (High Level)	High Level KPIs Results	KPIs (Intermediate and Low Level)	Intermediate and Low Level KPIs Total results	RESIDUAL WASTE	SEPARATE COLLECTION CIRCUITS			Cartography additional information (GIS) Code Index Map
					WCC1	WCC5	WCC6	WCC7	
					Residual Waste	Plastic and Metal	Paper and Cardboard	Glass	
					domestic-Commercial	Domestic-Commercial	Domestic-Commercial	Domestic-Commercial	
					Collective (street bins)	Collective (street bins)	Collective (street bins)	Collective (street bins)	
O.1	T.1. Average reduction of municipal waste generation	N/A	T.1.2. Real amount (level) of waste generated (RAG) (waste characterization %)		58,50% biowaste, 4% paper and cardboard, 1% glass 18,5% Light packaging 4% miscellaneous 5,25% Sanitary textile + nappies 0,15 % batteries 6,5 % 10 mm sieved fractions 2,1 % Others	100 % light packaging	100 % paper and cardboard	100 %glass	N/A
			T.1.3. Annual generation rate (aGR) (Kg/inhab/year)	N/A	426	11	20	2	3.1.1,3.1.2,3.1.3,3.1.4
O.2	T.2. Increase of the average of urban waste sorted	N/A	T.2.3. Total gross separate collection (gSC) (kg or ton)	N/A	N/A	2281	4167	3180	N/A
			T.2.4. Net separate collection rate (nSC rate) %	N/A	N/A	2,34	4,75	3,27	N/A
			T.2.5. Gross Separate collection rate (gSC rate) %	N/A	N/A	2,34	4,75	3,27	N/A
			T.2.2. Level of impurities (impropers) (imp) (%)		24,71	0	0	0	N/A
			T.2.1. Amount of waste collected (WC) (ton/year)	97331	87703	2281	4167	3180	3.1.1,3.1.2,3.1.3,3.1.4
			T.1.1. Estimated biowaste treated by comunity/home composting	N/A	N/A				N/A
0.2	T.3. Decrease of the average of waste sent to final disposal	N/A	T.3.1. Primary waste destination (rwPD) (Kg)	149593000	299243000 Kg				N/A
			T.3.2. Dry recyclables to primary destination (dPD) (Kg)	30935000		30935000 Kg			N/A
			T.3.3. Organic recyclables to primary destination (oPD) (Kg)	N/A	N/A				N/A
			T.3.4. Residual waste to primary destination (rwPD) (Kg)	149593000	149593000				N/A
			T.3.5. Destination recycling (DREC) (Kg)	30878000	30878000				N/A
O.3	T.1. Average reduction of municipal waste generation	N/A	reviewT.1.2 and T.1.3						N/A
	T.2. Increase of the average of urban waste sorted	N/A	review T.2.3, T.2.4, T.2.5, T.2.2, T.2.1 and T.1.1						N/A
	S.1. Number of people saying that have modified their habits	N/A	S.1.1. Number of people saying that have modified their habits regarding prevention	0	N/A				N/A
			S.1.2. Number of people saying that have modified their habits regarding separate collection	0	N/A				N/A
O.4	S.2. Increase the easy access to the separation facilities	N/A	T.4.1. Ratio accessibility residual waste to recyclable waste	1 (maximal)	Collective (eco islands) urderground bins				4.1, 5.1
			T.4.2. Accessibility to collection system (m)	79,06	Collective (eco islands) urderground bins				4.1, 5.1

			T.4.3. Accessibility to the recycling centers (Km)	*N/A (it doesn't exist a recycling center)*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*
			S.2.1. Collection points accessible to disability people		*Optimized for disabled people*	*Optimized for disabled people*	*Optimized for disabled people*	*Optimized for disabled people*	*N/A*
O.4	*T.4. Kilometers saved by the project*	*N/A*	*T.4.4. Distance km of the collection route (km)*	*127,32*	*71,88*	*55,44*			*6.1.1, 6.1.2, 6.1.3*
O.4	*E.1. GHG emissions saved by the project*	*N/A*	*T.5. Life Cycle Assesment (LCA)*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*
O.4	*S.3. Increase of green jobs created*	*N/A*	*S.3.1. Green jobs created*	*0*	*0*				*N/A*
O.4	*S.4. Increase of legislative changes proposed*	*N/A*	*S.4.1. Legislative changes proposed*	*0*	*0*				*N/A*
O.4	*S.5. Increase of Zero Waste Events*	*N/A*	*S.5.1. Nº of Zero Waste Events*	*0*	*0*				*N/A*
O.4	*S.6. Increase of Zero Waste Eco-Systems*	*N/A*	*S.6.1. Nº of Zero Waste Eco-Systems*	*0*	*0*				*N/A*
O.4	*S.7. Increase of Green Public Procurement*	*N/A*	*S.7.1. Nº of Green Public Procurement*	*0*	*0*				*N/A*
O.4	*C.1. Decrease of the average of the urban management cost*	*N/A*	*C.1.3. Management Cost (MC) (€)*	*80535,83*	*26323,41*	*18075,85*	*18075,85*	*18060,72*	*N/A*
			C.1.3.1. Collection and transport cost (CTC) (€)	*64918,40*	*21218,80*	*14570,60*	*14570,60*	*14558,40*	*N/A*
			C.1.3.2. Final management costs (FMC) (€)	*LI*	*LI*	*LI*	*LI*	*LI*	*N/A*
			C.1.3.3. Other common costs (oCO) (€)	*15617,43*	*5104,61*	*3505,25*	*3505,25*	*3502,32*	*N/A*
			C.1.1. Budget applied to awareness and prevention campaigns (€)	*LI*	*LI*	*LI*	*LI*	*LI*	*N/A*
			C.1.2. Treatment gate fee (€) (€/ton treated)	*350,18*	*350,18*				*N/A*

General information for each waste collection circuit (WCC)	Waste Collection Data	RESIDUAL WASTE	SEPARATE COLLECTION CIRCUITS			Cartography additional information (GIS) Code Index Map
		WCC1	WCC5	WCC6	WCC7	
		Residual Waste	Plastic and Metal	Paper and Cardboard	Glass	
		Domestic-Commercial	Domestic-Commercial	Domestic-Commercial	Domestic-Commercial	
		Collective (street bins)	Collective (street bins)	Collective (street bins)	Collective (street bins)	
WCD.1. Number of collection points (n)		28	21	21	21	2.1
WCD.2. Provision of deposit points to users (inhab/deposit point)		86	115	115	115	2.1
WCD.3. Capacity for the reception per deposit points (l per deposit)		3000	5000	5000	3000	N/A
WCD.4. Waste collection frequency (days/week)		3	When the fill sensors indicate more than 80%	When the fill sensors indicate more than 80%	When the fill sensors indicate more than 80%	3.1.1
WCD.5. Number of recycling centers (n)	1					7.1
WCD.6. Number of collection trucks (n)	4	1	1	1	1	N/A
WCD.7. Type of truck		Crane-lift	Crane-lift	Crane-lift	Crane-lift	N/A
WCD.8. Volume of the trucks (l/truck)		15000	15000	15000	30000	N/A
WCD.9. Fuel consumption during collection (l/100 km)	Diesel	90	60	60	70	N/A
WCD.10. Engine type		Man-TGS 26320 Euro IV	Scania-310 Euro IV	Scania-310 Euro IV	Scania-N331 Euro III	N/A
WCD.11. Main component of the collection point		Steel	Steel	Steel	Steel	N/A
WCD.12. Surface occupied by the collection system (m^2 occupied urban surface)		100	84	84	84	N/A
WCD.13. Cleaning frequency of the collection point (days/year)		Weekly	Weekly	Weekly	Weekly	N/A
WCD.14. Compacting factor of the collection truck		LI	LI	LI	LI	N/A

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WCD.15. Other energy usage in the collection process	No	No	No	No	No	N/A
WCD.16. Accessibility to the recycling centers	LI	LI	LI	LI	LI	N/A
WCD.17. Average time opening of the recycling center (days/year)	LI	LI	LI	LI	LI	N/A
WCD.18. Average time of daily opening of the recycling center (hour/day)	LI	LI	LI	LI	LI	N/A

Code ID. Contex data	Context Data	Cartography additional information (GIS) Code Index Map
CD.1. Location of pilot site	Carcavelos	1.1, 1.2, 1.3
CD.2. Population per pilot (inhab)	2.432 inhabitans (in pilots)	1.3
CD.3. Average salary rate (€)	900 €	N/A
CD.4. Population density (inhab/m2)	5.174 inhab/km^2	1.3
CD.5. Collection System type	4C	2.1
CD.6. Localization of deposit points (x,y)	Residual waste, paper and cardboard, lightpackaging, glass	2.1
CD.7. Localization of the treatment plants (x,y)	Treatment deposit plant	6.1.3
CD.8. Localization parking of trucks (x,y)	N/A	6.1.3
CD.9. Localization of recycling centers (x,y)	N/A	7.1
CD.10. Census inhabitans per house (x,y)	N/A	N/A

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Table 5 Updated KPIs in Halandri baseline

ID Objectives	KPIs (High Level)	High Level KPIs Results	KPIs (Intermediate and Low Level)	Intermediate and Low Level KPIs Results	RESIDUAL WASTE	SEPARATE COLLECTION CIRCUITS				Cartography additional information (GIS) Code Index Map
					WCC1-WCC4	WCC5	WCC6	WCC7	WCC8	
					Residual Waste	Green Waste	Bulky and Green	Recyclables General (Blue Bin)	Glass	
					Domestic + commercial	domestic-commercial-public	Domestic-Commercial	Domestic-Commercial	Domestic-Commercial	
					Collective (street green bins)	kerbside	kerbside	Collective (street blue bins)	Collective (street blue bins)	
O.1	T.1. Average reduction of municipal waste generation	N/A	T.1.2. Real amount (level) of waste generated (RAG) (waste characterization %)	Biowaste 50%; Paper and cardboard 14%; Glass 4%; Plastics 6%; Metals 2%; Complex packaging 0% Textiles / shoes 2%; Nappies 0%; 10mm sieved fractions 0%; Others (aggregated) 23%	Biowaste 71%; Paper and cardboard 11%; Glass 5%; Plastics 7%; Metals 2%; Complex packaging 0% Textiles / shoes 3%; Nappies 0%; 10mm sieved fractions 0%; Others (aggregated) 0%	Biowaste 72%; Paper and cardboard 0%; Glass 0%; Plastics 0%; Metals 0%; Complex packaging 0% Textiles / shoes 0%; Nappies 0%; 10mm sieved fractions 8%; Others (aggregated) 20%	Biowaste 28%; Paper and cardboard 0%; Glass 0%; Plastics 0%; Metals 0%; Complex packaging 0% Textiles / shoes 0%; Nappies 0%; 10mm sieved fractions 0%; Others (aggregated) 72%	Biowaste 0%; Paper and cardboard 39%; Glass 2%; Plastics 12%; Metals 3%; Complex packaging 0% Textiles / shoes 0%; Nappies 0%; 10mm sieved fractions 0%; Others (aggregated) 45%	Biowaste 0%; Paper and cardboard 0%; Glass 96%; Plastics 3%; Metals 1%; Complex packaging 0% Textiles / shoes 0%; Nappies 0%; 10mm sieved fractions 0%; Others (aggregated) 0%	N/A
			T.1.3. Annual generation rate (aGR) (Kg/inhab/year)	540,37	325,72	11,46	97,96	98,08	0,44	3.3.1, 3.3.2, 3.3.3, 3.3.4, 3.3.5
O.2	T.2. Increase of the average of urban waste sorted	N/A	T.2.3. Total gross separate collection (gSC) (ton)	15.924,90	N/A	850	7268	7277	33	N/A
			T.2.4. Net separate collection rate (nSC rate) (%)	N/A	N/A	19,22%	82,54%	39,09%	2,25%	N/A
			T.2.5. Gross separate collection rate (gSC rate) (%)	39,72%	N/A	24,10%	89,49%	71,19%	2,34%	N/A
			T.2.2. Level of impurities (impropers) (imp) (%)	N/A	25,7	20,3	7,8	45,1	4,0	N/A
			T.2.1. Amount of waste collected (WC) (ton/year)	40.090,90	24166	850	7268	7277	33	3.3.1, 3.3.2, 3.3.3, 3.3.4, 3.3.5
			T.1.1. Estimated biowaste treated by comunity/home composting (kg or ton)	-	N/A	N/A	N/A	N/A	N/A	N/A
0.2	T.3. Decrease of the average of waste sent to final disposal	N/A	T.3.1. Primary waste destination (rwPD) (ton)	40.090,90	24166	850	7268	7277	33	N/A
			T.3.2. Dry recyclables to primary destination (dPD) (ton)	15.074,90	N/A	N/A	7268	7277	33	N/A
			T.3.3. Organic recyclables to primary destination (oPD) (ton)	850,00	N/A	850	7268	N/A	N/A	N/A
			T.3.4. Residual waste to primary	24166	24166	N/A	N/A	N/A	N/A	N/A

			destination (rwPD) (ton)							
			T.3.5. Destination recycling (DREC) (Kg)	LI	LI	LI	LI	LI	LI	N/A
O.3	T.1. Average reduction of municipal waste generation	N/A	reviewT.1.2 and T.1.3							N/A
	T.2. Increase of the average of urban waste sorted	N/A	review T.2.3, T.2.4, T.2.5, T.2.2, T.2.1 and T.1.1							N/A
	S.1. Number of people saying that have modified their habits (end of project)	N/A	S.1.1. Number of people saying that have modified their habits regarding prevention	0	N/A	N/A	N/A	N/A	N/A	N/A
			S.1.2. Number of people saying that have modified their habits regarding separate collection	0	N/A	N/A	N/A	N/A	N/A	N/A
O.4	S.2. Increase the easy access to the separation facilities	N/A	T.4.1. Ratio accessibility residual waste to recyclable waste	0,38 (median)	Proximity (good)	LI	LI	Proximity (median)	LI	N/A
			T.4.2. Accessibility to collection system (m)	N/A	46	LI	LI	120	LI	N/A
			T.4.3. Accessibility to the recycling centers (Km)	25	N/A	N/A	N/A	N/A	N/A	7.2
			S.2.1. Collection points accessible to disability people	LI	LI	LI	LI	LI	LI	N/A
O.4	T.4. Kilometers saved by the project	N/A	T.4.4. Distance km of the collection route (km)	1087	751	-	-	336	-	6.3.1, 6.3.2
O.4	E.1. GHG emissions saved by the project	N/A	T.5. Life Cycle Assesment (LCA)	N/A	N/A	N/A	N/A	N/A	N/A	N/A
O.4	S.3. Increase of green jobs created	N/A	S.3.1. Green jobs created	0	0	0	0	0	0	N/A
O.4	S.4. Increase of legislative changes proposed	N/A	S.4.1. Legislative changes proposed	0	0	0	0	0	0	N/A
O.4	S.5. Increase of Zero Waste Events	N/A	S.5.1. Nº of Zero Waste Events	0	0	0	0	0	0	N/A
O.4	S.6. Increase of Zero Waste Eco-Systems	N/A	S.6.1. Nº of Zero Waste Eco-Systems	0	0	0	0	0	0	N/A
O.4	S.7. Increase of Green Public Procurement	N/A	S.7.1. Nº of Green Public Procurement	0	0	0	0	0	0	N/A
O.4	C.1. Decrease of the average of the urban management cost	N/A	C.1.3. Management Cost (MC) (€)	331,00	183,00		0	148,00	0,00	N/A
			C.1.3.1. Collection and transport cost (CTC) (€)	263,00	138,00		0	125,00	0,00	N/A
			C.1.3.2. Final management costs (FMC) (€)	68,00	45,00		0	23,00	0,00	N/A
			C.1.3.3. Other common costs (oCO) (€)	LI	LI	LI	LI	LI	LI	N/A
			C.1.1. Budget applied to awareness and prevention campaigns (€/year)	LI	LI	LI	LI	LI	LI	N/A
			C.1.2. Treatment gate fee (€/ton treated)	LI	LI	LI	LI	LI	LI	N/A

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General information for each waste collection circuit (WCC)	Waste Collection Data	RESIDUAL WASTE	SEPARATE COLLECTION CIRCUITS		Cartography additional information (GIS) Code Index Map
		WCC1	WCC5	WCC6	
		Residual Waste	Light packaging, paper and cardboard, glass	Biowaste	
		Domestic-Commercial	Domestic-Commercial	Domestic-Commercial	
		Collective (street green bins)	Collective (street blue bins)	Collective (street brown bins)	
WCD.1. Number of collection points (n)		4824	1256	N/A (D1.4)	2.2
WCD.2. Provision of deposit points to users (inhab/deposit point)		15	59	N/A (D1.4)	2.2
WCD.3. Capacity for the reception per deposit points (l)		1100	1100	N/A (D1.4)	N/A
WCD.4. Waste collection frequency (days/week)		7	3	N/A (D1.4)	3.2.1, 3.2.2
WCD.5. Number of recycling centers (n)	1			N/A (D1.4)	7.2
WCD.6. Number of collection trucks (n)		19+8	6	N/A (D1.4)	N/A
WCD.7. Type of truck		Crane-lift, Rear-loading	Crane-lift	N/A (D1.4)	N/A
WCD.8. Volume of the trucks (l/truck)		20000-10000	16000	N/A (D1.4)	N/A
WCD.9. Fuel consumption during collection (l/100 km)	Diesel	LI	LI	N/A (D1.4)	N/A
WCD.10. Engine type		Euro VI	Euro VI	N/A (D1.4)	N/A
WCD.11. Main component of the collection point		Other	HDPE	N/A (D1.4)	N/A
WCD.12. Surface occupied by the collection system (m^2 occupied urban surface)		LI	LI	N/A (D1.4)	N/A
WCD.13. Cleaning frequency of the collection point (days/year)		175	LI	N/A (D1.4)	N/A
WCD.14. Compacting factor of the collection truck		LI	LI	N/A (D1.4)	N/A
WCD.15. Other energy usage in the collection process	No	No	No	N/A (D1.4)	N/A
WCD.16. Accessibility to the recycling centers	LI	LI	LI	N/A (D1.4)	N/A
WCD.17. Average time opening of the recycling center (days/year)	LI	LI	LI	N/A (D1.4)	N/A
WCD.18. Average time of daily opening of the recycling center (hour/day)	LI	LI	LI	N/A (D1.4)	N/A

Code ID. Contex data	Context Data	Cartography additional information (GIS) Code Index Map
CD.1. Location of pilot site	Halandri	1.1, 1.2, 1.3
CD.2. Population per pilot (inhab)	74.192	1.3
CD.3. Average salary rate (€)	1.092 €	N/A
CD.4. Population density (inhab/km^2)	6,9 inhabitans/Km^2	1.3
CD.5. Collection System type	3C	2.2
CD.6. Localization of deposit points (x,y)	Residual waste, Biowaste, Others fraction selective collection (lightpackaging, paper and cardboard and glass)	2.2
CD.7. Localization of the treatment plants (x,y)	Treatment deposit plant: residual waste biogas, biowaste and recyclable waste	6.2.4
CD.8. Localization parking of trucks (x,y)	N/A	6.2.4
CD.9. Localization of recycling centers (x,y)	N/A	7.2
CD.10. Census inhabitans per house (x,y)	N/A	N/A

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Table 6 Updated KPIs in Seveso baseline

ID Objectives	KPIs (High Level)	High Level KPIs Results	KPIs (Intermediate and Low Level)	Intermediate and Low Level KPIs Results	RESIDUAL WASTE	SEPARATE COLLECTION CIRCUITS				Cartography additional information (GIS) Code Index Map
					WCC1-WCC4	WCC5-WCC6	WCC7-WCC8	WCC9	WCC10	
					Residual Waste	Light packaging	Food waste	Paper and cardboard	Glass	
					Domestic + commercial (+ street dustbins)	Domestic-Commercial	Domestic-Commercial	Domestic-Commercial	Domestic-Commercial	
					Door to door	Door to door	Door to door	Door to door	Door to door	
O.1	T.1. Average reduction of municipal waste generation	N/A	T.1.2. Real amount (level) of waste generated (RAG) (waste characterization %)	Biowaste 25%; Paper and cardboard 16%; Glass 9%; Plastics 7%; Metals 3%; Complex packaging 1% Textiles / shoes 4%; Nappies 4%; 10mm sieved fractions 6%; Others (aggregated) 26%	Biowaste 10%; Paper and cardboard 20%; Glass 1%; Plastics 8%; Metals 1%; Complex packaging 1% Textiles / shoes 21%; Nappies 20%; 10mm sieved fractions 8%; Others (aggregated) 9%	Biowaste 0%; Paper and cardboard 0%; Glass 0%; Plastics 69%; Metals 9%; Complex packaging 5% Textiles / shoes 0%; Nappies 0%; 10mm sieved fractions 0%; Others (aggregated) 18%	Biowaste 76%; Paper and cardboard 5%; Glass 0%; Plastics 1%; Metals 0%; Complex packaging 0% Textiles / shoes 0%; Nappies 0%; 10mm sieved fractions 17%; Others (aggregated) 0%	Biowaste 0%; Paper and cardboard 97%; Glass 0%; Plastics 0%; Metals 0%; Complex packaging 0% Textiles / shoes 0%; Nappies 0%; 10mm sieved fractions 0%; Others (aggregated) 3%	Biowaste 0%; Paper and cardboard 0%; Glass 86%; Plastics 0%; Metals 0%; Complex packaging 0% Textiles / shoes 0%; Nappies 0%; 10mm sieved fractions 0%; Others (aggregated) 14%	N/A
			T.1.3. Annual generation rate (aGR) (Kg/inhab/year)	379,68	71,75	30,67	67,17	44,59	38,47	3.3.1, 3.3.2, 3.3.3, 3.3.4, 3.3.5
O.2	T.2. Increase of the average of urban waste sorted	N/A	T.2.3. Total gross separate collection (gSC) (ton)	7.228,44	N/A	719,92	1576,85	1046,68	903,06	N/A
			T.2.4. Net separate collection rate (nSC rate) (%)	N/A	N/A	77%	51%	70,80%	98,57%	N/A
			T.2.5. Gross separate collection rate (gSC rate) (%)	81,1%	N/A	94%	51%	72,76%	114,62%	N/A
			T.2.2. Level of impurities (impropers) (imp) (%)	N/A	65,2	17,9	1,6	2,7	14,0	N/A
			T.2.1. Amount of waste collected (WC) (ton/year)	8.912,65	1684,21	719,92	1576,85	1046,68	903,06	3.3.1, 3.3.2, 3.3.3, 3.3.4, 3.3.5
			T.1.1. Estimated biowaste treated by comunity/home composting (kg or ton)	-	N/A	N/A	N/A	N/A	N/A	N/A
0.2	T.3. Decrease of the average of waste sent to final disposal	N/A	T.3.1. Primary waste destination (rwPD) (ton)	8.912,65	1684,21	719,92	1576,85	1046,68	903,06	N/A
			T.3.2. Dry recyclables to primary destination (dPD) (ton)	5.651,59	N/A	719,92	N/A	1046,68	903,06	N/A
			T.3.3. Organic recyclables to primary destination (oPD) (ton)	1.576,85	N/A	N/A	1576,85	N/A	N/A	N/A
			T.3.4. Residual waste to primary destination (rwPD) (ton)	1684,21	1684,21	N/A	N/A	N/A	N/A	N/A
			T.3.5. Destination recycling (DREC) (Kg)	LI	LI	LI	LI	LI	LI	N/A
O.3	T.1. Average reduction of	N/	reviewT.1.2 and T.1.3							N/A

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	municipal waste generation	A								
	T.2. Increase of the average of urban waste sorted	N/A	review T.2.3, T.2.4, T.2.5, T.2.2, T.2.1 and T.1.1							N/A
	S.1. Number of people saying that have modified their habits (end of project)	N/A	S.1.1. Number of people saying that have modified their habits regarding prevention	0	N/A					N/A
			S.1.2. Number of people saying that have modified their habits regarding separate collection	0	N/A					N/A
O.4	S.2. Increase the easy access to the separation facilities	N/A	T.4.1. Ratio accessibility residual waste to recyclable waste	1 (maximum)	100 % accessible (door to door for all fractions)					N/A
			T.4.2. Accessibility to collection system (m)	N/A	100 % accessible (door to door)					N/A
			T.4.3. Accessibility to the recycling centers (Km)	1,2	N/A					7.2
			S.2.1. Collection points accessible to disability people	100% accessible	100 % accessible (door to door)					N/A
O.4	T.4. Kilometers saved by the project	N/A	T.4.4. Distance km of the collection route (km)	6727	1435	1339	1319	1315	1319	6.3.1, 6.3.2
O.4	E.1. GHG emissions saved by the project	N/A	T.5. Life Cycle Assesment (LCA)	N/A	N/A	N/A	N/A	N/A	N/A	N/A
O.4	S.3. Increase of green jobs created	N/A	S.3.1. Green jobs created	0	0					N/A
O.4	S.4. Increase of legislative changes proposed	N/A	S.4.1. Legislative changes proposed	0	0					N/A
O.4	S.5. Increase of Zero Waste Events	N/A	S.5.1. Nº of Zero Waste Events	0	0					N/A
O.4	S.6. Increase of Zero Waste Eco-Systems	N/A	S.6.1. Nº of Zero Waste Eco-Systems	0	0					N/A
O.4	S.7. Increase of Green Public Procurement	N/A	S.7.1. Nº of Green Public Procurement	0	0					N/A
O.4	C.1. Decrease of the average of the urban management cost	N/A	C.1.3. Management Cost (MC) (€)	277,25 €/t for all MSW including common costs	445.531,07 €	36.464,79 €	337.791,44 €	184.932,78 €	174.551,32 €	N/A
			C.1.3.1. Collection and transport cost (CTC) (€)	LI	220.372,43 €	123.902,43 €	247.804,86 €	123.902,43 €	123.902,43 €	N/A
			C.1.3.2. Final management costs (FMC) (€)	LI	129.683,91 €	- 127.532,54 €	127.211,72 €	- 86.277,04 €	- €	N/A
			C.1.3.3. Other common costs (oCO) (€)	LI	95.474,73 €	40.094,90 €	89.986,58 €	61.030,35 €	50.648,89 €	N/A
			C.1.1. Budget applied to awareness and prevention campaigns (€/year)	10000	Sensitization campaigns managed by GELSIA					N/A
			C.1.2. Treatment gate fee (€/ton treated)	LI	96,56	-180	88,64	-80	0	N/A

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General information for each waste collection circuit (WCC)	Waste Collection Data	RESIDUAL WASTE	SEPARATE COLLECTION CIRCUITS				Cartography additional information (GIS) Code Index Map
		WCC1-WCC4	WCC5-WCC6	WCC7-WCC8	WCC9	WCC10	
		Residual Waste	Light packaging	Food waste	Paper and cardboard	Glass	
		Domestic + commercial (+ street dustbins)	Domestic-Commercial	Domestic-Commercial	Domestic-Commercial	Domestic-Commercial	
		Door to door	Door to door	Door to door	Door to door	Door to door	
WCD.1. Number of collection points (n)		4060	4060	4060	LI	LI	2.3
WCD.2. Provision of deposit points to users (inhab/deposit point)	N/A	N/A	N/A	N/A	N/A	N/A	2.3
WCD.3. Capacity for the reception per deposit points (l)	per bag	110	110	120	LI	LI	N/A
WCD.4. Waste collection frequency (days/week)	2	2	2	2	LI	LI	3.3.1, 3.3.2, 3.3.3, 3.3.4, 3.3.5
WCD.5. Number of recycling centers (n)	1	N/A	N/A	N/A	N/A	N/A	7.3
WCD.6. Number of collection trucks (n)	LI				LI	LI	N/A
WCD.7. Type of truck		Rear-loading	Rear-loading	Rear-loading	LI	LI	N/A
WCD.8. Volume of the trucks (l/truck)	28000-32000 (trucks), 7000 (vans)				LI	LI	N/A
WCD.9. Fuel consumption during collection (l/100 km)	Diesel	LI	LI	LI	LI	LI	N/A
WCD.10. Engine type	Euro III-Euro V (trucks and vans), Euro V FAP (vans)				LI	LI	N/A
WCD.11. Main component of the collection point	Other	Other	Other	Other	LI	LI	N/A
WCD.12. Surface occupied by the collection system (m^2 occupied urban surface)		8120	8120	4060	LI	LI	N/A
WCD.13. Cleaning frequency of the collection point (days/year)	N/A	N/A	N/A	N/A	N/A	N/A	N/A
WCD.14. Compacting factor of the collection truck	2	2	2	2	LI	LI	N/A
WCD.15. Other energy usage in the collection process	No				LI	LI	N/A
WCD.16. Accessibility to the recycling centers	LI	LI	LI	LI	N/A	N/A	N/A
WCD.17. Average time opening of the recycling center (days/year)	260				N/A	N/A	N/A
WCD.18. Average time of daily opening of the recycling center (hour/day)	7				N/A	N/A	N/A

Code ID. Contex data	Context Data	Cartography additional information (GIS) Code Index Map
CD.1. Location of pilot site	Seveso	1.1, 1.2, 1.3
CD.2. Population per pilot (inhab)	23.474	1.3
CD.3. Average salary rate (€)	1.092 €	N/A
CD.4. Population density (inhab/km^2)	3.198 inhabitans/Km^2	1.3
CD.5. Collection System type	Door to Door (5C)	2.3
CD.6. Localization of deposit points (x,y)	All fractions	2.3
CD.7. Localization of the treatment plants (x,y)	Regional composting, treatment deposit plant, anaerobic digestion	6.3.2
CD.8. Localization parking of trucks (x,y)	N/A	6.3.2
CD.9. Localization of recycling centers (x,y)	N/A	7.3
CD.10. Census inhabitans per house (x,y)	N/A	N/A

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Table 7 Updated KPIs in Zamudio baseline

ID Objetives	KPIs (High Level)	High Level KPIs Results	KPIs (Intermediate and Low Level)	Intermediate and Low Level KPIs Results	RESIDUAL WASTE	SEPARATE COLLECTION CIRCUITS				Cartography additional information (GIS) Code Index Map
					WCC1-WCC3	WCC4	WCC5-WCC6	WCC7	WCC8	
					Residual Waste	Light Packaging	Paper-cardboard	Organic waste	Glass	
					Domestic (city center), Industry and Tecnologhy park	Industry and Domestic	Industry and domestic	Industry and Domestic	Industry and Domestic	
					Bins, door to door and bins	Street bins	Street bins	Street bins	Street bins with Vacri system	
O.1	T.1. Average reduction of municipal waste generation	N/A	T.1.2. Real amount (level) of waste generated (RAG) (waste characterization %)	Biowaste 23%; Paper and cardboard 17%; Glass 8%; Plastics 11%; Metals 2%; Complex packaging 0% Textiles / shoes 1%; Nappies 2%; 10mm sieved fractions 5%; Others (aggregated) 30%	Biowaste 24%; Paper and cardboard 12%; Glass 5%; Plastics 12%; Metals 1%; Complex packaging 0% Textiles / shoes 1%; Nappies 5%; 10mm sieved fractions 3%; Others (aggregated) 37%	Biowaste 2%; Paper and cardboard 7%; Glass 4%; Plastics 52%; Metals 14%; Complex packaging 9% Textiles / shoes 0%; Nappies 2%; 10mm sieved fractions 0%; Others (aggregated) 9%	Biowaste 2%; Paper and cardboard 93%; Glass 1%; Plastics 2%; Metals 0%; Complex packaging 0% Textiles / shoes 0%; Nappies 0%; 10mm sieved fractions 0%; Others (aggregated) 2%	Biowaste 92%; Paper and cardboard 0%; Glass 0%; Plastics 1%; Metals 0%; Complex packaging 0% Textiles / shoes 0%; Nappies 0%; 10mm sieved fractions 0%; Others (aggregated) 7%	Biowaste 0%; Paper and cardboard 0%; Glass 98%; Plastics 0%; Metals 0%; Complex packaging 0% Textiles / shoes 0%; Nappies 0%; 10mm sieved fractions 0%; Others (aggregated) 2%	N/A
			T.1.3. Annual generation rate (aGR) (Kg/inhab/year)	908,64	732,73	22,37	56,84	3,78	30,08	3.3.1, 3.3.2, 3.3.3, 3.3.4, 3.3.5
O.2	T.2. Increase of the average of urban waste sorted	N/A	T.2.3. Total gross separate collection (gSC) (ton)	588,94	N/A	74,88	190,30	12,65	100,72	N/A
			T.2.4. Net separate collection rate (nSC rate) (%)	N/A	N/A	36,77%	40,21%	2,02%	104,79%	N/A
			T.2.5. Gross separate collection rate (gSC rate) (%)	19,36%	N/A	36,89%	40,21%	2,02%	104,81%	N/A
			T.2.2. Level of impurities (impropers) (imp) (%)	N/A	1%	34%	0%	8%	2%	N/A
			T.2.1. Amount of waste collected (WC) (ton/year)	3.042,13	2453,19	74,88	190,30	12,65	100,72	3.3.1, 3.3.2, 3.3.3, 3.3.4, 3.3.5
			T.1.1. Estimated biowaste treated by comunity/home composting (kg or ton)	-	N/A	N/A	N/A	N/A	N/A	N/A
0.2	T.3. Decrease of the average of waste sent to final disposal	N/A	T.3.1. Primary waste destination (rwPD) (ton)	3.042,13	2453,193	74,88	190,30	12,65	100,72	N/A
			T.3.2. Dry recyclables to primary destination (dPD) (ton)	565,97	N/A	74,88	190,295	N/A	100,716	N/A
			T.3.3. Organic recyclables to primary destination (oPD) (ton)	22,97	N/A	N/A	N/A	12,65	N/A	N/A
			T.3.4. Residual waste to primary destination (rwPD)	2453,193	2453,193	N/A	N/A	N/A	N/A	N/A

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			(ton)							
			T.3.5. Destination recycling (DREC) (Kg)	LI	LI	LI	LI	LI	LI	N/A
O.3	T.1. Average reduction of municipal waste generation	N/A	reviewT.1.2 and T.1.3							N/A
	T.2. Increase of the average of urban waste sorted	N/A	review T.2.3, T.2.4, T.2.5, T.2.2, T.2.1 and T.1.1							N/A
	S.1. Number of people saying that have modified their habits (end of project)	N/A	S.1.1. Number of people saying that have modified their habits regarding prevention	0	N/A	N/A	N/A	N/A	N/A	N/A
			S.1.2. Number of people saying that have modified their habits regarding separate collection	0	N/A	N/A	N/A	N/A	N/A	N/A
O.4	S.2. Increase the easy access to the separation facilities	N/A	T.4.1. Ratio accessibility residual waste to recyclable waste	N/A	N/A	0,54	0,77	0,45	0,85	N/A
			T.4.2. Accessibility to collection system (m)	N/A	46	242,46	170,79	287,78	153,98	N/A
			T.4.3. Accessibility to the recycling centers (Km)	1,5	N/A	N/A	N/A	N/A	N/A	7.2
			S.2.1. Collection points accessible to disability people	LI	LI	LI	LI	LI	LI	N/A
O.4	T.4. Kilometers saved by the project	N/A	T.4.4. Distance km of the collection route (km)	487	751	71	69	27	98	6.3.1, 6.3.2
O.4	E.1. GHG emissions saved by the project	N/A	T.5. Life Cycle Assesment (LCA)	N/A	N/A	N/A	N/A	N/A	N/A	N/A
O.4	S.3. Increase of green jobs created	N/A	S.3.1. Green jobs created	0	0	0	0	0	0	N/A
O.4	S.4. Increase of legislative changes proposed	N/A	S.4.1. Legislative changes proposed	0	0	0	0	0	0	N/A
O.4	S.5. Increase of Zero Waste Events	N/A	S.5.1. Nº of Zero Waste Events	0	0	0	0	0	0	N/A
O.4	S.6. Increase of Zero Waste Eco-Systems	N/A	S.6.1. Nº of Zero Waste Eco-Systems	0	0	0	0	0	0	N/A
O.4	S.7. Increase of Green Public Procurement	N/A	S.7.1. Nº of Green Public Procurement	0	0	0	0	0	0	N/A
O.4	C.1. Decrease of the average of the urban management cost	N/A	C.1.3. Management Cost (MC) (€/ton treated)	2532,93	225,66	LI	15,23	187,06	LI	N/A
			C.1.3.1. Collection and transport cost (CTC) (€/ton treated)	-	-	-	-	-	-	N/A
			C.1.3.2. Final management costs (FMC) (€/ton treated)	-	-	-	-	-	-	N/A
			C.1.3.3. Other common costs (oCO) (€/ton treated)	-	-	-	-	-	-	N/A
			C.1.1. Budget applied to awareness and prevention campaigns (€/year)	LI	LI	LI	LI	LI	LI	N/A
			C.1.2. Treatment gate fee (€/ton treated)	LI	LI	LI	LI	LI	LI	N/A

General information for each waste collection circuit (WCC)	Waste Collection Data General Level	RESIDUAL WASTE		SEPARATE COLLECTION CIRCUITS					Cartography additional information (GIS) Code Index Map
		WCC1	WCC2	WCC5	WCC6	WCC7	WCC8	WCC10	
		Residual Waste	Residual Waste	Light packaging	Paper and cardboard	Paper and cardboard	Glass	Biowaste	
		Industry	Domestic + commercial	Industry and Domestic	Industry	Domestic-Commercial	Industry, Domestic-Commercial	Industry, Domestic-Commercial	
		Door to door	Street bins	Street bins	Street bins	Street bins	Street bins with Vacri system	Street bins with lock system	
WCD.1. Number of collection points (n)		355	74	47	176	29	32	19	2.4
WCD.2. Provision of deposit points to users (inhab/deposit point)		N/A	45	71	N/A	115	105	176	2.4

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WCD.3. Capacity for the reception per deposit points (l)		(31*360)+(102*800)+(138*1000)+(84*1100)	(40*3200)+(1*1700)+(33*1100)	(41*3500)*(6*3000)	(11*360)+(165*1100)	29*3200	32*3000	19*1100	N/A
WCD.4. Waste collection frequency (days/week)		2	2	1	1	1	Once a month	1	3.4.1, 3.4.2, 3.4.3, 3.4.4, 3.4.5, 3.4.6, 3.4.7
WCD.5. Number of recycling centers (n)	1								7.4
WCD.6. Number of collection trucks (n)		2	3	1	1	1	1	2	N/A
WCD.7. Type of truck		Rear-loading	Side-loading	Crane-lift	Rear-loading	Side-loading	Crane-lift	Rear-loading	N/A
WCD.8. Volume of the trucks (l/truck)		24000	25000	20000	24000	25000	40000	1450	N/A
WCD.9. Fuel consumption during collection (l/100 km)	Diesel	69 l/100 km	62 l/100 km	50 l/100 km	72 l/100 km	80 l/100 km	48 l/100 km	12 l/100 km	N/A
WCD.10. Engine type		LI	LI	LI	LI	LI	LI	LI	N/A
WCD.11. Main component of the collection point	HDPE	HDPE	HDPE	HDPE	HDPE	HDPE	HDPE	HDPE	N/A
WCD.12. Surface occupied by the collection system (m2 occupied urban surface)	LI	LI	LI	LI	LI	LI	LI	LI	N/A
WCD.13. Cleaning frequency of the collection point (days/year)		LI	7	2	LI	7	4	12 (Some of them every week)	N/A
WCD.14. Compacting factor of the collection truck	LI	LI	LI	LI	LI	LI	LI	LI	N/A
WCD.15. Other energy usage in the collection process	No	No							N/A
WCD.16. Accessibility to the recycling centers	LI	LI	LI	LI	LI	LI	LI	LI	N/A
WCD.17. Average time opening of the recycling center (days/year)	LI	LI	LI	LI	LI	LI	LI	LI	N/A
WCD.18. Average time of daily opening of the recycling center (hour/day)	LI	LI	LI	LI	LI	LI	LI	LI	N/A

Code ID. Contex data	Context Data	Cartography additional information (GIS) Code Index Map
CD.1. Location of pilot site	Zamudio	1.1, 1.2, 1.3
CD.2. Population per pilot (inhab)	3348	1.3
CD.3. Average salary rate (€)	1.330 €	N/A
CD.4. Population density (inhab/km^2)	167,4 inhab/Km^2	1.3
CD.5. Collection System type	5C	2.4.1, 2.4.2
CD.6. Localization of deposit points (x,y)	Residual waste, paper and cardboard, lightpackaging, glass and biowaste	2.4.1, 2.4.2
CD.7. Localization of the treatment plants (x,y)	Treatment deposit plants: residual waste, biowaste, lightpackaging, paper and cardboard and glass	6.4.8
CD.8. Localization parking of trucks (x,y)	N/A	6.4.8
CD.9. Localization of recycling centers (x,y)	N/A	7.4
CD.10. Census inhabitans per house (x,y)	N/A	N/A

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3 State of the level of development and implementation of the sensors and eco-solutions

This section will summarize the status of the deployments of the eco-solutions and the monitoring system (sensors deployed) in each pilot at Milestone 2 of the project.

3.1 Status of the sensor layer

According to the Grant Agreement, at the end of this phase we should have achieved:

> "Coordination of agents external to the project which preparatory actions are required for the deployment of the pilots, such as, permission grants (building permissions, informed consents, etc), purchase and deployment of sensors, informative meetings with the project stakeholders, etc."
>
> Annex II Actions to Carry out for each Eco-innovative Solution in Every Pilot and Phase

Annex 1 shows how these general guidelines are distributed into the different sensors and pilot sites (*ref*) and the actual status at Milestone 2 (*stat*). In this table, the rows on the top represent the planned and the actual status of the development of every sensor. Please note that some sensors have just to be acquired and integrated and others have to be developed (as any solutions near market have been found).

On the other hand, the bottom of the table provides information about the planned and the actual status of the integration of the sensors per pilot site. In general, at the end of Milestone 2, solutions should have had to be purchased and deployed except for these that have to be developed in Waste4Think. In this case, prototypes should have already been produced.

More details about the sensors can be found in the technical Deliverables D2.1 and D2.2.

In general, the components of the sensor layer that are commercial products are already purchased and installed. Its integration are already ongoing (ahead of schedule). The main exceptions to this are the locking system in Zamudio. There have been problems to find a commercial solution that fits all functional requirements requested in this pilot site. In fact, with the new solution the filling sensor there has been discarded in this process as the technical solution found made it redundant. Finally, a solution has been found (see Deliverable D2.1 for details) but some development is still needed by FDEUSTO and the provider of the solution as no commercial solution fulfils the functional requirements.

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3.2 Status of the Eco-Solutions

This Section presents the planned status of the implementation of the functional requirements accordingly to the Grant Agreement as well as the status of the deployment of the eco-solutions and their implementation in each pilot site at Milestone 2. Please note that some functional requirements have to be provided by different technical solutions that are going to be tested at different pilot sites (in order to assess their replicability). In this sense every implementation could be in different stages at the different pilot sites. Only the one that has the most advanced status is provided

The following sections summarize the status of every type of eco-solutions:

1. Operational and Planning
2. Apps
3. Educational Materials
4. Social Actions
5. Treatment Plants

3.2.1 Operation and Planning

According to the Grant Agreement, at the end of this phase we should have achieved:

> "Back-end: Real time data recording from sensors."
>
> Annex II Actions to carry out for each Eco-innovative Solution in Every Pilot and Phase

Annex 2 shows how these general guidelines are distributed into the different functional requirements that have to be implemented and their testing at the pilot sites, as well as their status at Milestone 2. In general, the back-end should have been prepared to receive information from the different sensors while the rest of tools should have been in α quality. Any eco-solution has been expected to be deployed in any pilot site (with the exception of the identification system of users in Seveso needed to deploy the PAYT).

Details about these tools could be found in Deliverables D2.1 to D2.10. Next we provide a detailed description of the status and main deviations detected for every component.

Next, status of the particular results of this group is explained.

3.2.1.1 R1: Operation and Management Module

This module is the one that have the biggest amount of changes between the planification and its implementation. In particular, the following changes have been identified:

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- After initial testing and consult with several experts it have been decided that the PROTON and PERSEO CEP engines and Wirecloud Mashup tool not only do not fulfill the requirements of the project but also lack even the most basic documentation, so they are not enough reliable to built upon them. Custom solutions for these functional requirements are going to be built to fulfill the functional requirements associated with these components.
- A prototype of the dashboard is built but a lot of functionalities have not started its implementation. At the moment, only some widgets are implemented. Moreover, the dashboard can only view at the moment real information and not information that comes from what-if scenarios.
- The what if scenario editors is going to be presented in Deliverable 2.7 as it is a central part of the Planning tool. On the other hand, the visual editor of predictive and explicative modules is going to be developed in this eco-solution and is going to be explained in Deliverable D2.1.
- It has been decided that all data models are going to be explained in Deliverable D2.1 as they are part of the back-end of the solution. In particular, data models to represent a what-if scenario, a best practice and invoices have been added.

The implementation of this module has some functional requirements ahead of schedule and others behind. In particular, the monitorization of alerts and the generation of models are the most important functions that are behind schedule. Another feature that have not started its implementation is the Citizen Behaviour Tracking. On the other hand, all monitoring functional requirement related to the identification of bags and routes have reach production quality already.

3.2.1.2 R2: Collection Module

Two deviations can be found on the collection module. On the one hand, two prevested components of R2 (the Mid Term Planning module and the Invoicing Planner Module) have been moved to the R3 Planning Module. On the other hand, only the optimization of the routes depending on the fill level is implemented (in fact is already in production status), the rest of optimizations have not started yet. The implementation of the rest of the functional requirements is being progressed according to the planification.

3.2.1.3 R3: Planning Module

Several modules that were planned to be in others parts of the architecture now are considered part of the Planning Module. In particular, the Green Procurement tool (previously in R1), Mid Term Planning tool (previously in R2) and parts of the Invoicing module (previously in R2) are now part of the Planning module. The details of all of these modules could be found in Deliverable D2.7. Please note that all use cases related to these tools refers to the planification of action, so it makes more sense to be included in

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this module. On the other hand, the Rules Manager tool (Deliverable 2.1), that has been considered as part of this module is now considered as part of the R1: Operation and Management Module. Please note that this module will be also used extensively in the Dashboard, so it has more sense to be presented there. The details of this tool could be found in Deliverable D2.1.

The implementation of some functional requirements is delayed. In particular, mock-ups of the What-if Scenario editor, the Invoicing Module as well as the Green Procurement tool have been defined but some functional requirements have not been started to be implemented. Please note that we have been prioritizing the implementation of all functional requirements needed to perform the baseline and the monitoring of the actions (nowcasting) as these are needed by other task.

3.2.1.4 R4: Circular Economy Module

This module also has a slight delay in the actions that have been carried out. At the moment, the data model of the database have been defined (see Deliverable D2.1) and the information to fill the database has been started to be collected (see Deliverable D1.2) but neither the database have been created nor the recommendation engine started to be implemented. Nevertheless, a prototype of the interface has been defined and draft of the APIs have been created. Please note, accordingly to the planification, the implementation should have to be started, but no concrete milestone for its functionality was set.

3.2.2 Apps

According to the Grant Agreement, at the end of this phase we should have:

> "Development started in month 12."
>
> Annex II. Actions to Carry out for each
> Eco-innovative Solution in Every Pilot and Phase

Annex 3 shows how these general guidelines are distributed into the different functional requirements of the apps that have to be implemented and their testing at the pilot sites, as well as their status at Milestone 2. In general, all functional requirements should have reached α status. Moreover, as before, any of the apps have been expected to be deployed at any pilot site.

More details about the apps can be found in Deliverables D4.11 and D4.12. This module is on track. All functionalities have reached α status.

3.2.3 Educational Materials

According to the Grant Agreement, at the end of this phase we should have:

> "Development started in month 6."
>
> Annex II. Actions to Carry out for each
> Eco-innovative Solution in Every Pilot and Phase

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Annex 5 shows how these general guidelines are distributed into the different functional requirements that have to be implemented and their testing at the pilot sites and their status at Milestone 2. In general, all functional requirements should have reached α status except the functional requirements related to the citizen science actions. Nevertheless, in this case, the learning materials should have been integrated with the curriculum of Hallandri and Zamudio.

More details about the Educational Materials can be found in Deliverables D4.3 to D4.5. An internal change has been made regarding the serious games over this plan. It was agreed to speed up the implementation of the Sorting Game and Eco-Design game in order to start earlier with the Social Actions that use them. To this end, all the efforts have been focused on the development of these games reaching a higher level of development (β, almost RC in the case of the Sorting Game). However, this has supposed that the implementation of the Virtual City and Planning game was delayed with respect to the planning but they have also progressed: one have a physical prototype and the other one have been designed. Details can be found in Deliverable D4.5.

By other hand, at M17 one STEM Lesson is finished and the others are being validated by the schools involved in the testing. Finally, the only group of functional requirements that is delayed is the one related to the Citizen Behaviour Tracking (Learning Analytics). At this moment only the Learning Analytics KPIs for the Sorting Game are defined.

3.2.4 Social Actions

According to the Grant Agreement, at the end of this phase we should have:

> " IT tools independent actions."
>
> Annex II. Actions to Carry out for each
> Eco-innovative Solution in Every Pilot and Phase

Annex 4 shows how these general guidelines are distributed into the different functional requirements that the Social Actions have implemented and the status of their testing at the pilot sites as well as their status at Milestone 2. In this case, we should give a slightly different interpretation to the levels on the table (they can be consulted in the legent included in Annex 4)

In general, all objectives should have reached α status except for those that are related to the monitorization methodology of the social actions and the identification of the best practices.

We can conclude that Social Actions are according to the plan with. In particular: Seveso has initiated or deployed almost all the Social Action foreseen. Halandri and Zamudio are starting to implement their set of Social Actions. Finally, Cascais will start with their Social Actions by the beginning of 2018. For more information about the status of each particular Social Action please refer to Section 4 of this deliverable.

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Moreover, more details about the Social Actions definition can be also found in Deliverables D4.1 and D4.2.

Finally, please note that regarding R17_FR1.4 (To identify Best Practices): the identification of Best practices has been done by each Pilot and a database is already created (Deliverable D1.2).

3.2.5 Treatment Plants

According to the Grant Agreement, at the end of this phase we should have made the:

> "Design of the plants based on detailed physicochemical characterization of food/kitchen waste, nappies and expired food samples and their pretreatments."
>
> Annex II. Actions to Carry out for each
> Eco-innovative Solution in Every Pilot and Phase

Annex 6 shows how these general guidelines are distributed into the different functional requirements that the New Treatment Plant have implemented and the status of their testing at the pilot sites as well as their status at Milestone 2. As before, in this case, we should give a slightly different interpretation to the levels on the table using a unique criteria shown in the legeng of the corresponding annex (Annex 6).

In general, all functional requirements should have reached α status.

More details about the design of the Treatment Plants can be found in Deliverables D3.1 to D3.3. These eco-solutions (R19 and R20) are ahead of plan, several of the functional requirements have already achieve β status but there are some of them that have not started yet. More specifically:

3. Pre-dried and shredded biowaste treatment plant: The separate source-sorted biowaste collection system is now well established in Halandri (see Section 5 for details of the related Social Action). The collected biowaste is transferred to a pilot-plant allocated in NTUA facilities where it is dried and shredded, generating the biomass product (FORBI). A pelletizer is used in place to generate the pellets. FORBI is transferred to NTUA, where experiments are on-going for the production of biohydrogen, biomethane, hythane, bioethanol, compost, activated carbon and electricity through MFC. It is also foreseen that by the first quarter of 2018 the pilot plant for the production of biogas from FORBI and its use to fuel the collection trucks enter into demonstration phase.
4. Pilot plant for nappies and expired food products valorisation: All major equipment for this pilot plant has been ordered and the installation is expected to be ready by the end of 2017 in the University of Patras. So, during the first quarter of 2018 the construction of the treatment plant is expected to be completed. In this way, the whole valorization chain is expected to start the demonstration phase from that moment, namely: the nappies

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shredding, the expired food products pulverization, their mixture pasteurization and digestion for biofuels production (hydrogen and methane) and composting of the solid digestate.

However, some functionalities are slightly delayed. In particular, the production of Hythane, the composting of the Waste Treatment Unit's sludge (and its monitorization) and the monitorization of the cost of the collection using the truck powered by CNG.

3.3 Waste4Think Story Map

Final public results or promo videos/demos of the eco-solutions will be available in the website of the project (Section Eco-solutions). However, in order to facilitate the monitoring of the development status of the solutions (not only the final versions) and their implementation in the pilot sites a Story Maps is being created. This web application combines narrative text with maps, videos, reports, websites, applications, etc.

Esri Story Maps is integrated in ArcGIS, cartographic representation platform and GIS. The web maps used in Esri Story Maps and their data provided are hosted in the cloud of ArcGIS Online.

This web application consists of entries called sections where the user can toggle so as to check the current status of the different tasks and eco-solutions proposed in the project.

Waste4ThinK Story Map will be updated on a regular basis for an exhaustive internal follow-up of the project and it will also allow to show the progress of the project in the subsequent deliverables of the project monitoring.

A series of figures which partially include some of the sections designed thanks to the use of StoryMaps are shown below:

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Waste4think

DeustoTech Energy & Environment

European WASTE4Think Project

1. European Context

The European Union plays a key role in international efforts to promote sustainable development throughout the world. The environmental policy of the EU up to **2020** is guided by the **Seventh Environmental Action Programme**, of which the European institutions and the Member States are jointly responsible.

One of the main perspectives in the Europe 2020 Strategy is to further advance progress towards the achievement of a Circular Economy (CE). The Waste4Think project promotes a major transformation of the current model of waste management so as to convert this model into the foundation of the principles of this new economy paradigm.

The CE aims to promote change towards a more **efficient economy** in the use of resources and an approach to development with low-carbon emissions. This new paradigm seeks to maintain the values of products materials and resources as long as possible.

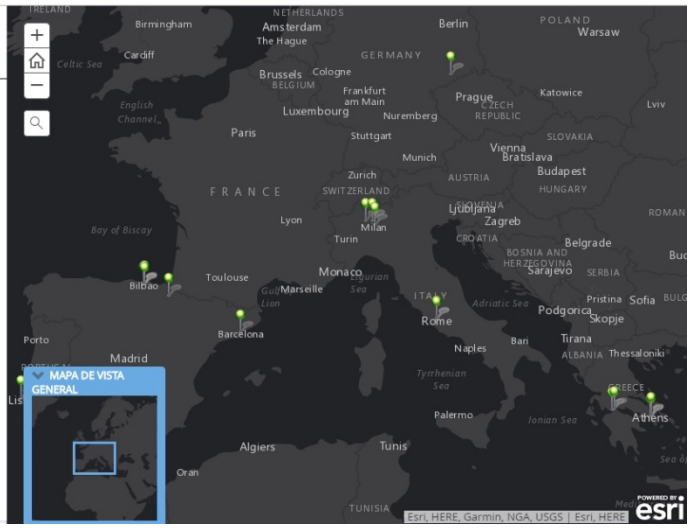
In this regards, there is a need to implement specific actions to quantify the degree

Waste4think

DeustoTech Energy & Environment

European WASTE4Think Project

1. DeustoTech
2. Zabala
3. City Council of Zamudio
4. Aclima
5. Green Technologies
6. EnBio
7. National Technical University of Athens
8. UPATRAS
9. Municipality of Halandri
10. Serious Games
11. ARS ambiente
12. Seveso municipality
13. Legambiente
14. SOFTline
15. MOBA
16. Virtualware
17. Cascais Ambiente



Waste4think

DeustoTech Energy & Environment

European WASTE4Think Project

Information Technology (IT):

Operation and Management Module:

- *Observatory*
- *Complex event processing (Sandwich)*
- *Pilot data Ingestion:*
  - Caracterization
  - Treatment deposit plant
- **Waste management KPIs**

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4 Social Action Plan Implementation

4.1 Baseline Surveys

The results and impact of the social actions (IT and non-IT) developed in each pilot are going to be monitored in different ways. Some of the impacts are cross-cutting and will be described following the general technical protocols. Generation per capita, separate collection rate, etc. are a result both from technical development of the W4T collections and social actions.

Nevertheless, behavioural and knowledge changes in terms of consumption, prevention awareness or separate collection habits must be evaluated through a comparison survey between a baseline before starting with the activities of the project and, at least, one final "photo" at the end.

A survey template was developed and adapted to each pilot (seeAnnex 10-Annex 12 along with their results) in order to know the previous habits and knowledge of the citizens regarding prevention and separate collection. In particular:

- Seveso

  In this case, two surveys were done, as they started the PAYT system early in the project timeline:

  - Survey 1 applied until end of June 2017 and it has been used for calculating the people changing habits because of PAYT and social acceptance of this ecosolution.
  - Survey 2 was used in end June – July 2017 to calculate the "neutral baseline" (behaviours on prevention and recycling of a neutral sample) and will be repeated at the end of the project.

  These surveys along with their results are available in Annex 10

- Halandri

  Halandri made their survey following asking also about the knowledge about the project. However, in the Annex 11 only the main results regarding prevention and separate collection habits have been described and translated.

- Zamudio

  In Zamudio a previous survey to citizens, commerces and industrial activities were done early during the project as a citizen science activity.

  Afterwards, a new survey was done following the proposal made in the framework of the project.

  Previous results "Preliminary Survey" and new ones "Final Survey" are described in Annex 12.

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- Cascais

The baseline survey will be done just before starting communication activities in the pilot neighborhood. The results will be presented in D1.5.

4.2 General description/summary of the Social Action Programme

The general objective is to promote a **change of thinking and behavior in people towards the society of sustainability**. Social Actions are necessary for a real and smoother achievement of this change of habits.

All the Social Actions foreseen in the W4T project have the same background: **involve the different target groups defined to develop critical thinking, adopt the values of the culture of sustainability and act in accordance with them**. The social actions are a strategy of environmental education and not only environmental communication.

To achieve the objectives, the pilots have developed a **global strategy to integrate all society in the process of environmental education and to influence** the whole population, without excluding any sector.

To ensure the effectiveness and integration of all the actions a monitoring system has been defined for each strategy and communication/sensitization activity (from collection of real data to social activities as forums, focal groups, social network scraping, etc.). The objective is to **obtain quantitative and qualitative data to evaluate the success of each strategy and improve the education strategies in order to reach the maximum number of results** and number of participants, and maximize the cost-effectiveness of the sensitization strategies.

A periodical critical review of the social, economical and environmental KPIs are going to be done, in order to evaluate the progress and achievement of the results. The actual results will be checked against the predicted values.

If significant deviations are recorded, a rigorous revision of the particular task will be made to detect possible problems and possible solutions.

Table 8 lists the social actions defined by each pilot.

Table 8. List of Social Strategies and Actions by each pilot.

Seveso Pilot
SE1 Citizens Sensitization. Funny door to door *SE1.1 Dinner or Lunch with waste* *SE1.2 Sensitization activity in public spaces or existing activities*

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Seveso Pilot

- *SE1.3 Elderly people house activities*
- *SE1.4 Sensitization in schools*
- *SE1.5 Sensitization in summer camps with children*

SE2 Campaign "virtuous households"

- *SE2.1 Citizens involvement*
- *SE2.2 Training and monitoring period*
- *SE2.3 Feedback activities*

SE3 Ecoevents

- *SE3.1 Preparation of the criteria, tendering and purchasing*
- *SE3.2 Celebration and monitoring of the Ecoevents.*

SE4 PAYT

- *SE4.1 Monitoring of the results with RFID bags, tax calculations and preparation of the campaign*
- *SE4.2 Implementation campaign.*
- *SE4.3 Incidences resolution and feedback to citizens*
- *SE4.4 Littering monitoring and dedicated campaign*
- *SE4.5 Other complementary activities*

SE5 Promotion campaign of reusable nappies families

- *SE5.1 Engagement of local stakeholders*
- *SE5.2 Campaign and training development*
- *SE5.3 Feedback to participants and general citizens*

SE6. Reusable nappies in a nursery (NEW)

- *SE6.1 Stakeholders engagement (nursery + washing service)*
- *SE6.2 Implementation*
- *SE6.3 Feedback to participants*

Cascais Pilot

C1 ID/PAYT containers system

- *C1.2 Implementation campaign – condominium meetings*
- *C1.3 Implementation campaign- workshops and DtD visits*
- *C1.4 Gammification-Award system*
- *C1.5 Promotion of the W4T Apps and games*
- *C1.6 Feedback to citizens*

C2 Tourist engagement

- *C2.1 Information to landlords*
- *C2.2 Dedicated campaign*

C3 W4T Schools

- *C3.1 Learning materials (mobile games and STEAM lessons)*
- *C3.2 Sorting game (primary) and Virtual and Planning game (secondary)*
- *C3. 3 EMAC own activities*

Zamudio Pilot

Z1 General Campaign

- *Z1.1 General presentations and comunication*
- *Z1.2 Participation workshops*
- *Z1.3 Citizens Science action*
- *Z1.4 NON BOTA ZER ("Where throw away what") campaign*
- *Z1.5 Summer camp*

Z2 Education Centers actions

- *Z2.1 Apply learning materials (and gamification) to improve the knowledge of prevention and separate collection*
- *Z2.2 Introduce self-composting*
- *Z2.3 Promote the reduction of the single use light packaging*
- *Z2.4 Improve selective collection and prevention*
- *Z2.5 Dedicated workshops in Zamudio Public School*

Z3 Food waste prevention

- *Z3.1 General campaign (information point, decalogue about good practices to cut food*

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Zamudio Pilot
wastage, etc.)
Z3.2 Creative cooking course
Z3.3 Food App
Z3.4 Food redistribution (Aunar agreement)
Z4 Commercial activities campaign
Z4.1 Initial Commercial Activities Diagnosis
Z4.2 Tupper campaign
Z4.3 Reusable bags campaign
Z4.4 Local Trade App Campaign
Z5 Composting
Z5.1 Community composting plant
Z5.2 Distribution of compost from ZW- Events to participants of balcony flower competition
Z6 PAYT
Z6.1 General information (newsletter, website, other)
Z6.2 Citizens participation process
Z6.3 Commercial activities participation
Z6.4 Industrial activities participation
Z6.5 DtD visits
Z6.6 Dedicated information point
Z7 Zero waste ecosystems
Z7.1 Town Hall pilot
Z7.2 Industries -Hotel
Z8 Ecoevents
Z8.1 "Day" festivals: fairs, demonstrations, running race…
Z8.2 Popular meals
Z8.3 Night festivals : concerts, drinking bars,…
Z9 Miscellanius
Z9.1 Mihiluze Quiz
Z9.2 Halloween - Candle workshop
Z9.3 Promotion of the domestic oil container
LAN party (parallel action)

Halandri Pilot
H1 Educational Centers activities
H1.1 Vocational School
H1.2 Gymnasium
H2 Actions at thechnical university
H2.1 Ecodesign modul introduction.
H2.2 Use of the Ecodesign game
H3 Foodwaste separate collection
H3.1 Initial seminars and campaign.
H3.2 Starting campaign.
H3.3 Feedback to the citizens.
H3.4 Extension of the new collection.
H4 Commercial Activities campaign
H4.1 Citizens science.
H4.2 Promotion of best consumption habits and waste handling in local commerce.
H5 Nappies collection
H5.1 Contact with nappies producers to make them participate to the pilot with nappies treatment.
H5.2 Start of the collection & treatment .Virtual operation of the Waste Treatment Unit in relation to typical daily routine of the nursery.
H5.3 Feedback actions to participants

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Annex 7 shows the Gantt Chart for the Social Actions implementation and the status at Milestone 2. This Gantt Chart is an update to the planning calendars foreseen in Deliverable *D4.1 Implementation of R17: non ICT Innovative Social Actions*. Please note that this Gantt will be updated, if necessary, in further versions of D4.1 and in Deliverable *D4.2 Implementation of R17: ICT based Innovative Social Actions* which will include the planification of those actions supported by the eco-solutions developed in Waste4Think. The qualitative description including lessons learnt of the Social Actions carried out until Milestone 2 can be consulted in Annex 13. However, this reporting methodology will be changed for the next monitoring reports as explained in the next Section. The quantitative results could be consulted later in the data model with the previous mentioned new methodology and will be published in the Waste4Think Community in Zenodo together with the qualitative results.

4.3 Social Actions Data Model

The initial structure of the data model can be found on deliverable D2.1 Technical Documentation of R1: Operation and Management Module. This original structure defined two entities for describing the concepts taking part of the Social Action Plan:

- Strategy: Global concept covering several actions that are carried out to achieve one or more goals. Strategy generally involves determining the target group, the area served, objectives and actions to achieve them.
- Action: Description of the general characteristics preparing an event like this with information such as the lessons learnt, the monitoring methodology, etc. This specific actions will try to have an influence on a target group.

As explained before, after reporting the first year of activities through a word template for qualitative recording of the social actions and lessons learnt, and an excel file for the quantitative reporting, a change both in the Social Actions reporting information content and introduction of data methodology have been proposed in order to:

1. Increase the quality of the information reported and the link between qualitative and quantitative data associated to each social action.
2. Help to the introduction of the related information through an online form where the pilots can report directly, upload photos and introduce directly the quantitative specific kpi for each social action implementation. In this way, information will be directly upload to the data model and would be available for different purposes: reporting, best practices database feed, kpi calculation, etc.

Therefore the original Action entity was split in two:

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- Action: General description of the action with the fields thatare common to the following Implementations.
- Implementation: Real field application of the Social Action with description that is particular to the implementation.

This way, a Strategy will consist of a series of actions that have a similar goal (i.e. Z8. Zero Waste Events). An Action describes in a general way a specific social process that will be carried out to reach the objectives of the Strategy (i.e. Z8.3 Night Festivals, Z8.2 Popular meals), and, finally, the Implementation describes the different particular executions of an Action (Z8.2 Popular meals, Z8.1.1 V Zamudio's Chocolate, Sweet and Craft Fair and XXV Basque Country Limousine Breed Championship).

The specific modifications to the Social Actions original data model in terms of entities and corresponding attributes along with an UML model to clarify the relation between entities and examples of these entities can be found in Annex 8

The final proposed templates for SA type and implementation are the following:

SOCIAL ACTION TYPE QUESTIONNAIRE
GENERAL INFORMATION
Name of the SA:
Related strategy:
Current status: *pending to start, ongoing, finished*
Short description: *Careful! Here only general description, specific implementation will go to SA Implementation table.*
Period of the implementation: *automatically calculated from data detailed in the SA implementation monitoring*
Target group: *automatic data from SA implementation*

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Waste streams:
Waste management stages:
Key words: *NEW! Add key words you think are relevant for searching issues*
AREA OF STUDY
Location: *Municipality*
Location description: *hab, urbanism… (the same in all SA)*
TOOLS
Communication tools: *(main media used etc.)*
Training tools:
Other tools developed during the campaign (financial, local , ordinance…)
MONITORING
Description of the monitoring methodology, if any (surveys, waste weighting, …).

RESULTS
Success of the action (0-5): *automatically calculated from data detailed in the SA implementation monitoring*

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Rate of participation (%):*automatically calculated from data detailed in the SA implementation monitoring*
Qualitative environmental impact
Qualitative social impact
Qualitative economical impact
Other Social KPI: *automatically calculated from data provided by SA implementation table*
LESSONS LEARNT
Key points of success
Detailed lessons learnt
OTHER INTERESTING INFORMATION
Costs: *please, try to quantify the cost of the action with as many details as possible. Depending on the type of action costs can go in this table (p.e. investment) or in implementation (staff, etc.)*
Other interesting information: *you can add here any other information you want to highlight, add links, documents, etc.*

SOCIAL ACTION IMPLEMENTATION QUESTIONNAIRE
GENERAL INFORMATION

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Name of the SA implementation:
Related SA type:
Start date:
End date:
Short description: *Specific of the implementation! Add any change done with respect of the SA type description*
Location: *Specific of the implementation! P.e. Elderly People Quartier*
TARGET GROUP AND PARTICIPATION
Target/s group/s involved:
Expected amount of stakeholders
Effective amount of stakeholders
RESULTS
Success of the action (0-5):
Other specific qualitative results to highlight:
Other KPI: *please, describe which quantitative data you have collected and results obtained, you can attach documents if necessary*

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OTHER INTERESTING INFORMATION
Costs: *please, try to quantify the cost of the action with as many details as possible. Depending on the type of action costs can go to TYPE (p.e. investment) or to IMPLEMENTATION (specific staff, etc.)*
Add some pictures of the activity
Links to press releases, etc.
Other interesting information

**Fields in "grey" are automatically calculated data, it's not necessary to fill this filed, but we have kept it in the questionnaire to clarify the utility of the information in each case.*

*** Quantitative data will be added also at the same time in the IMPLEMENTTION report: RESULTS-OTHER.*

5 KPIs monitoring

5.1 Methodology updates or improvements

During this period no updates has been made in the WESTE methodology for the monitoring of the pilots.

5.2 Integral waste management evaluation indicators

According to the pilot planning and the environmental programme of each pilot site the set of KPIs defined for the integral waste management evaluation will be calculated and reported when significant changes in the management system would be expected, as it is shown in Table 1.

Please note that for D1.4 only significant changes have been carried out in Seveso (with the implementation of PAYT) and Halandri (with the introduction of biowaste collection). So, in this period KPIs for waste management chain evaluation will be calculated only for these two pilots. Note also, that the main changes in the systems will be made before Milestone 3. Milestone 4 corresponds to a 6 moth-period for preliminary test, so these KPIs will not be calculated until Milestone 5, after the full test period.

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5.2.1 Halandri

The separate waste collection streams of the Municipality of Halandri are: residual waste (green bin), recyclables (plastic, metal, paper, glass) (blue bin). Paper/cardboard (yellow bin) started in 2017. Household Food Waste (brown bin) is also separately collected for approximately 250 households participating in the W4T pilot-scale programme. Other specific waste streams separately collected are: used tires, batteries and accumulators, end-of-life vehicles (ELVs), waste of electric and electronic equipment (WEEEs). A more detailed description of the pilot can be found in Annex D of deliverable D1.1 Pilots planning and Execution.

The collection of Household Food Waste (HFW) within the framework of Waste4Think project started on December of 2016. On M17 (November of 2017) a special collection of all the waste generated by 10 households that participate in Waste4Think for 10 days was organized by the waste management department of the Municipality of Halandri. They were asked to separate their waste in 3 streams suitable for green, blue and brown bins, respectively.

The results generated after 10 days collection of HFW showed a remarkable decrease up to almost 90% of the residual waste (green bin) which is an overrated result, because the sample (of the 10 households) is not representative, is focused only on the Waste4Think participants, which are part of the citizens with a highly increased environmental awareness.

Making a projection of this results to the total generation in the municipality of Halandri, it is estimated that 76% of the household waste ending up in landfills today may be diverted if the collection system of food waste introduced in Waste4Think is extended to the whole population with the same success than reached with these 10 families. This could be even increased further if recyclables collection is improved in terms of quality, as the residues from the blue bin are also led to the landfill today.

Assessing the impurities content in each main collection stream in the baseline and in this study of 10 families, it may be concluded:

1. A large quantity of recyclables and other waste that should not be disposed in the green bin, are disposed to this stream today. This is also the case for the presumably more "environmentally aware Waste4Think participants. This necessitates an intensified campaign for recycling.

2. A very large percentage of the waste collected in the blue bins should not be there. This is not the case for the Waste4Think participants who dispose to the blue bins impurities amounting to only 10% of the collected waste.

3. The quality of the food waste collected by the participants is excellent as the impurities were only 2%.However, these results are not conclusive as the sample of 10 families with a high

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level of awareness is not representative of the whole municipality and a new characterization will be carried out to be included in D1.5 Deployment & Integration Report.

Finally, the maps included for the new circuit implemented are listed below and can be consulted in Annex 9 Cartography for Halandri:

1. Location of biowaste deposit points in Halandri
2. Biowaste collection route in Halandri
3. Total collection route in Halandri

5.2.2 Seveso

In Seveso, the most important change in waste collection scheme has been implemented in May 2017 (M12), as from the beginning of that month the Pay As You Throw waste tax scheme was made effective after the approval of the new municipal regulation.

The approved regulation stated that from 1st May, 2017, bags were counted for the variable part of the tax.

The typical reaction to this is an increase in separate collection, as citizens try to reduce the generation of residual waste in order to save money. But in the case of Seveso, which was already experiencing a very high recycling rate of 75-77% before PAYT, no one was 100% confident that a further increase could be expected. That KPI was almost at the “theoretical maximum”, commonly believed to be around 80%, so going beyond that level was considered difficult.

However, waste composition analyses performed in April 2017 (just before the introduction of PAYT) showed that in residual waste bag a high amount of recyclables was still present; 65.2% of the 71.2 kg/capita year residual generated was still constituted by fractions that were delivered wrongly in that fraction (i.e. considered “impurities” in the monitoring). Basically, it was paper, light packaging and other mixed packaging.

Monitoring what happened in the period May – October 2017, the increase in separate collection actually took place, reaching 81-82% in September / October.

The first invoice with the variable part was sent in November 2017, and in that moment the new waste characterizations where performed.

In the following chart, the shift of waste fractions collected is displayed. By projecting on the whole 2017 the amount collected in May-Oct, the key considerations are the following:

- Residual waste decreased -18% (-13 kg/ca), reaching 59 kg/capita/year which is really a value reached only by best performers in all Italy and Europewide.

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- The decrease of -13 kg/capita of residual waste corresponded to an increase of about +5 kg/capita of food waste collected, +1 paper/cardboard, +2 glass, while light packaging (plastics-metal) didn't increase (-1)-.

The fact of light packaging not increasing is quite interesting. Typically, when introducing PAYT, people tend to shift to light packaging the delivery of those items that formerly they threw to residual waste, like a yoghurt plastic glass a bit dirty etc. Or even, they could put in light packaging what is actually not allowed increasing contamination in that fraction. This aspect can be analyzed looking at the impurity level of light packaging: it was 17.9% in April 2017 and 28.8% in October. It is true that there is a significant increase, so new sensitization campaigns are needed in order to keep the quality of that fraction good. But if converted in kg/capita, it's just 3.1 kg/capita more impurities in light packaging, compared to an overall decrease of 13 kg/ca of residual waste and, more interestingly, a decrease of "impurities" in residual waste (from 65,2% to 47,9% or, in kg/ca, from 47.0 to 28.2).

In other words, citizens delivered more correctly about 19 kg/ca of recyclable fractions, with the adverse effect of +3.1 kg/ca more impurities in light packaging.

With the next monitoring period, more considerations will be done including cost assessment and the first results of the social KPI (people changing habits), of which preliminary estimations have already been done.

		Residual waste	Light packaging	Food waste
kg/capita	Baseline apr 17	71,7	30,7	67,17
kg/capita	Monitoring nov 17	58,1	29,9	68,82
% impurities	Baseline apr 17	65,20%	17,90%	1,60%
% impurities	Monitoring nov 17	47,90%	28,80%	2,80%
kg/capita	evolution apr 17 - nov 17	-18,9	+3,1	+0,9

Table 11 summarizes the results of the update of the KPIs for Seveso for month 17 (November 2017) and Table 12 together shows its comparative with the baseline.

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Table 9 Results of the Waste Mangement KPIs for Seveso (November 2017)

ID Objectives	KPIs (High Level)	High Level KPIs Results	KPIs (Intermediate and Low Level)	Intermediate and Low Level KPIs Results	RESIDUAL WASTE	SEPARATE COLLECTION CIRCUITS				Cartography additional information (GIS) Code Index Map
					WCC1-WCC4	WCC5-WCC6	WCC7-WCC8	WCC9	WCC10	
					Residual Waste	Light packaging	Food waste	Paper and cardboard	Glass	
					Domestic + commercial (+ street dustbins)	Domestic-Commercial	Domestic-Commercial	Domestic-Commercial	Domestic-Commercial	
					Door to door	Door to door	Door to door	Door to door	Door to door	
O.1	T.1. Average reduction of municipal waste generation	N/A	T.1.2. Real amount (level) of waste generated (RAG) (waste characterization %)	Biowaste 26%; Paper and cardboard 15%; Glass 9%; Plastics 7%; Metals 3%; Complex packaging 0% Textiles / shoes 2%; Nappies 5%; 10mm sieved fractions 5%; Others (aggregated) 28%	Biowaste 4%; Paper and cardboard 16%; Glass 0%; Plastics 10%; Metals 1%; Complex packaging 0% Textiles / shoes 14%; Nappies 34%; 10mm sieved fractions 14%; Others (aggregated) 6%	Biowaste 0%; Paper and cardboard 0%; Glass 0%; Plastics 61%; Metals 8%; Complex packaging 3% Textiles / shoes 0%; Nappies 0%; 10mm sieved fractions 0%; Others (aggregated) 29%	Biowaste 88%; Paper and cardboard 5%; Glass 0%; Plastics 1%; Metals 0%; Complex packaging 0% Textiles / shoes 0%; Nappies 0%; 10mm sieved fractions 4%; Others (aggregated) 2%	Biowaste 0%; Paper and cardboard 97%; Glass 0%; Plastics 0%; Metals 0%; Complex packaging 0% Textiles / shoes 0%; Nappies 0%; 10mm sieved fractions 0%; Others (aggregated) 3%	Biowaste 0%; Paper and cardboard 0%; Glass 86%; Plastics 0%; Metals 0%; Complex packaging 0% Textiles / shoes 0%; Nappies 0%; 10mm sieved fractions 0%; Others (aggregated) 14%	N/A
			T.1.3. Annual generation rate (aGR) (Kg/inhab/year)	386,10	58,14	29,92	68,82	45,46	38,45	3.3.1, 3.3.2, 3.3.3, 3.3.4, 3.3.5
O.2	T.2. Increase of the average of urban waste sorted	N/A	T.2.3. Total gross separate collection (gSC) (ton)	7.504,75	N/A	702,3663801	1615,494119	1067,050115	902,5448405	N/A
			T.2.4. Net separate collection rate (nSC rate) (%)	N/A	N/A	89%	56%	77,202%	99,582%	N/A
			T.2.5. Gross separate collection rate (gSC rate) (%)	84,614%	N/A	125%	57%	79,34%	115,79%	N/A
			T.2.2. Level of impurities (impropers) (imp) (%)	N/A	47,9	28,8	2,8	2,7	14,0	N/A
			T.2.1. Amount of waste collected (WC) (ton/year)	8.869,44	1364,694128	702,3663801	1615,494119	1067,050115	902,5448405	3.3.1, 3.3.2, 3.3.3, 3.3.4, 3.3.5
			T.1.1. Estimated biowaste treated by comunity/home composting (kg or ton)	193,92	N/A	N/A	N/A	N/A	N/A	N/A
0.2	T.3. Decrease of the average of waste sent to final disposal	N/A	T.3.1. Primary waste destination (rwPD) (ton)	8.869,44	1364,694128	702,3663801	1615,494119	1067,050115	902,5448405	N/A
			T.3.2. Dry recyclables to primary destination (dPD) (ton)	5.889,25	N/A	702,3663801	N/A	1067,050115	902,5448405	N/A
			T.3.3. Organic recyclables to primary destination (oPD) (ton)	1.809,41	N/A	N/A	1615,494119	N/A	N/A	N/A
			T.3.4. Residual waste to primary destination (rwPD) (ton)	1364,694128	1364,694128	N/A	N/A	N/A	N/A	N/A
			T.3.5. Destination recycling (DREC) (Kg)	LI	LI	LI	LI	LI	LI	N/A

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O.3	T.1. Average reduction of municipal waste generation	N/A	reviewT.1.2 and T.1.3							N/A
	T.2. Increase of the average of urban waste sorted	N/A	review T.2.3, T.2.4, T.2.5, T.2.2, T.2.1 and T.1.1							N/A
	S.1. Number of people saying that have modified their habits (end of project)	N/A	S.1.1. Number of people saying that have modified their habits regarding prevention	0	N/A					N/A
			S.1.2. Number of people saying that have modified their habits regarding separate collection	0	N/A					N/A
O.4	S.2. Increase the easy access to the separation facilities	N/A	T.4.1. Ratio accessibility residual waste to recyclable waste	1 (maximum)	100 % accessible (door to door for all fractions)					N/A
			T.4.2. Accessibility to collection system (m)	N/A	100 % accessible (door to door)					N/A
			T.4.3. Accessibility to the recycling centers (Km)	1,2	N/A					7.2
			S.2.1. Collection points accessible to disability people	100% accessible	100 % accessible (door to door)					N/A
O.4	T.4. Kilometers saved by the project	N/A	T.4.4. Distance km of the collection route (km)	6727	1435	1339	1319	1315	1319	6.3.1, 6.3.2
O.4	E.1. GHG emissions saved by the project	N/A	T.5. Life Cycle Assesment (LCA)	N/A	N/A	N/A	N/A	N/A	N/A	N/A
O.4	S.3. Increase of green jobs created	N/A	S.3.1. Green jobs created	0	0					N/A
O.4	S.4. Increase of legislative changes proposed	N/A	S.4.1. Legislative changes proposed	2	0					N/A
O.4	S.5. Increase of Zero Waste Events	N/A	S.5.1. Nº of Zero Waste Events	1	0					N/A
O.4	S.6. Increase of Zero Waste Eco-Systems	N/A	S.6.1. Nº of Zero Waste Eco-Systems	0	0					N/A
O.4	S.7. Increase of Green Public Procurement	N/A	S.7.1. Nº of Green Public Procurement	0	0					N/A
O.4	C.1. Decrease of the average of the urban management cost	N/A	C.1.3. Management Cost (MC) (€)	277,25 €/t for all MSW including common costs	445.531,07 €	36.464,79 €	337.791,44 €	184.932,78 €	174.551,32 €	N/A
			C.1.3.1. Collection and transport cost (CTC) (€)	LI	220.372,43 €	123.902,43 €	247.804,86 €	123.902,43 €	123.902,43 €	N/A
			C.1.3.2. Final management costs (FMC) (€)	LI	129.683,91 €	- 127.532,54 €	127.211,72 €	- 86.277,04 €	- €	N/A
			C.1.3.3. Other common costs (oCO) (€)	LI	95.474,73 €	40.094,90 €	89.986,58 €	61.030,35 €	50.648,89 €	N/A
			C.1.1. Budget applied to awareness and prevention campaigns (€/year)	10000	Sensitization campaigns managed by GELSIA					N/A
			C.1.2. Treatment gate fee (€/ton treated)	LI	96,56	-180	88,64	-80	0	N/A

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Table 10 Evolution of the High Level KPIs with respect to the baseline in Seveso

Amount of waste collected (ton/year)	RESIDUAL WASTE	SEPARATE COLLECTION CIRCUITS					TOTAL
	WCC1-WCC4	WCC5-WCC6	WCC7-WCC8	WCC9	WCC10	Estimated biowaste treated by comunity/home composting	
	Residual Waste	Light packaging	Food waste	Paper and cardboard	Glass		
	Domestic + commercial (+ street dustbins)	Domestic-Commercial	Domestic-Commercial	Domestic-Commercial	Domestic-Commercial	Domestic	
	Door to door	Door to door	Door to door	Door to door	Door to door	Door to door	ton/year
Baseline (04/2017)	1684,21	719,92	1576,85	1046,68	903,06	193,92	8912,65
Monitoring (11/2017)	1364,69	702,37	1615,49	1067,05	902,54	193,92	8869,44
T.2. Increase of the average of urban waste sorted (T.2.1. Amount of waste collected (WC) (ton/year) (after PAYT)	-319,5158716	-17,55361992	38,64411883	20,37011464	-0,515159519	0	-43,21068395
%	-18,97	-2,44	2,45	1,95	-0,06		-0,48

Annual generation rate (Kg/inhab/year)	RESIDUAL WASTE	SEPARATE COLLECTION CIRCUITS				TOTAL
	Residual Waste	Light packaging	Food waste	Paper and cardboard	Glass	
						Kg/inhab/year
Baseline (04/2017)	71,75	30,67	67,17	44,59	38,45	386,10
Monitoring (11/2017)	58,14	29,92	68,82	45,46	38,45	386,10
T.1. Average reduction of municipal waste generation (T.1.3. Annual generation rate (aGR) (Kg/inhab/year)	13,61	0,75	-1,65	-0,87	0,00	0,00
%	23,41	2,50	-2,39	-1,91	0,00	0,00

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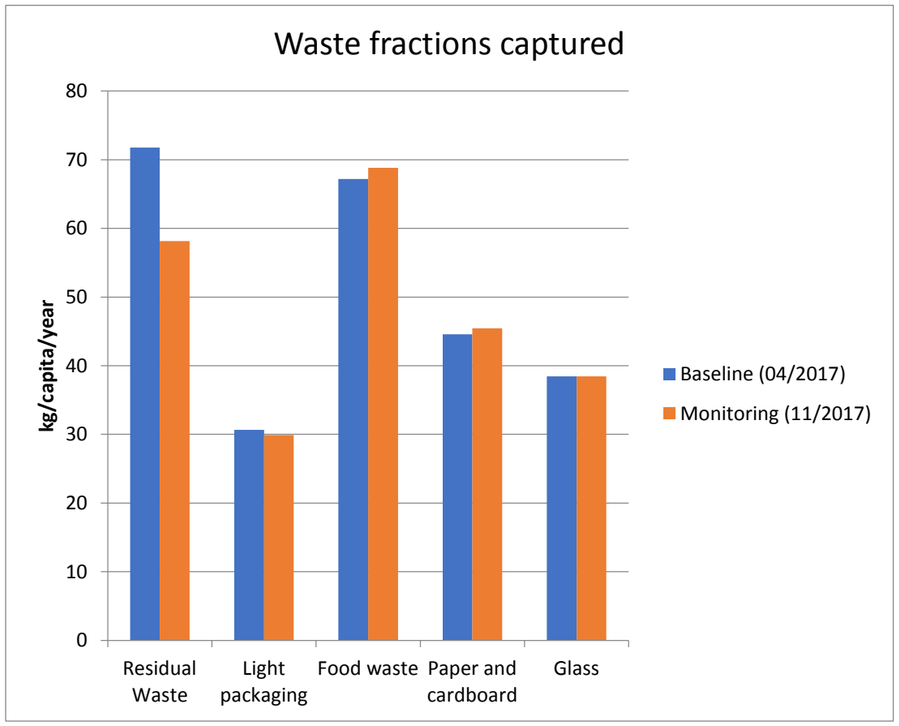

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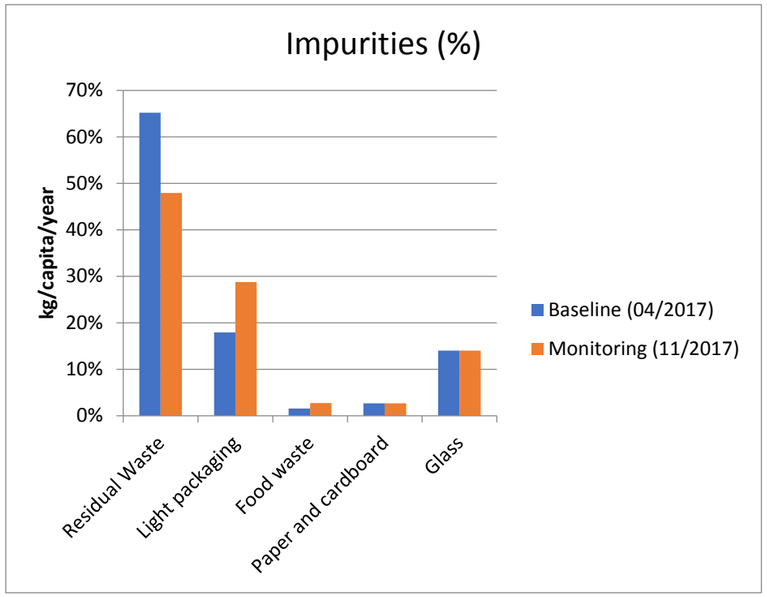
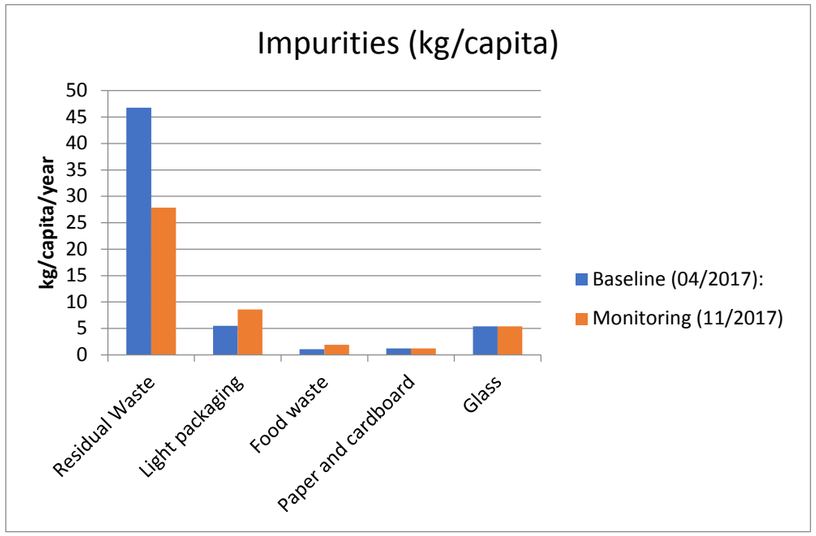
Impurities (%)	RESIDUAL WASTE	SEPARATE COLLECTION CIRCUITS			
	Residual Waste	Light packaging	Food waste	Paper and cardboard	Glass
Baseline (04/2017)	65,22%	17,93%	1,58%	2,70%	14,00%
Monitoring (11/2017)	47,92%	28,76%	2,75%	2,70%	14,00%
T.2. Increase of the average of urban waste sorted (T.2.2. Level of impurities (impropers) (imp) (%)	-17%	11%	1%	0%	0%



Impurities (kg)	RESIDUAL WASTE	SEPARATE COLLECTION CIRCUITS			
	Residual Waste	Light packaging	Food waste	Paper and cardboard	Glass
Baseline (04/2017):	46,79	5,50	1,06	1,20	5,38
Monitoring (11/2017)	27,86	8,61	1,90	1,23	5,38
T.2. Increase of the average of urban waste sorted (T.2.2. Level of impurities (impropers) (imp) (Kg)	-18,93	3,11	0,84	0,02	0,00



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	Increase of legislative changes proposed (nº)
Baseline (04/2017):	0
Monitoring (11/2017)	2
S.4. Increase of legislative changes proposed (S.4.1. Legislative changes proposed)	2

	Increase of Zero Waste Events (nº)
Baseline (04/2017):	0
Monitoring (11/2017)	1
S.5. Increase of Zero Waste Events (S.5.1. Nº of Zero Waste Events)	1

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5.3 Eco-solution specific indicators

At this stage any technical eco-solutions has been tested yet. So their KPIs cannot be measured yet. In fact the eco-solutions are expected to be completely developed and tested in Milestone 4, so results of the evaluation of their KPIs will be provided in Deliverables D1.6 and D1.7, respectively. For these eco-solutions that have enough progress, partial results could be provided in the monitoring deliverable corresponding to Milestone 3 (Deliverable D1.5).

However, at this stage several non-IT tools based social actions (R17) have been carried out. The results of these KPIs are shown in Section 6.

6 Lessons learnt

Regarding the monitoring of the Social Actions, a new methodology has been proposed after using the first ne during the first year. Some aspects have been detected and recommended a change in monitoring and reporting, moving to the new methodology explained in Section 4.3:

- Some activities are repeated several times during the project deployment. Initially we decided to add the different methodologies or lessons learnt, results, etc. in the same template, with the objective of avoiding repeated information. This leaded to some lose of information and traceability. In this sense, we finally created a new template separating common information of each social action (type) from specific data collected each time a social action is done (implementation).
- Reporting quantitative and qualitative information in different files have produced some misunderstandings between data from qualitative reporting and the specific kpi. And more important, reporting the qualitative part has usually lead to an omission of the excel file with quantitative data. So, reporting of quantitative kpi has been added to each social action implementation template.
- On the other hand, high expectations were raised regarding potential kpi related to each social action strategy when pilots prepared the proposal at the beginning of the project (see *D4.1 Implementation of R17: non ICT innovative Social Actopms*). Afterwards, less indicators could have been calculated showing that quantitative data is much more difficult to obtain that at the beginning was foreseen. New rules for reporting social actions are to try to add few and selected kpi.

Added to these changes, the pilots will report directly to the system adding directly all the needed information in a way that is directly suitable to be used for the different foreseen purposes detected in the

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project: better reporting and visualization in the website, increase of the experiences included in the database, increase replicability, etc.

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Annexes to Deliverable 1.4

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Annex 1 Planning for the development and integration of the sensor layer and status at Milestone 2

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		2016											2017												2018												2019											
		1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
		Use case analysis					M1	Preparatory Actions																	M2	Deployment & Integration											M3	Preliminary Test				M4	Full Test					M5			
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42						
																				ref	star								ref	star						ref	star						ref	star					
	DEVELOPMENT STATUS																																															
S1	Citizen ID																			B	1								RC							RC							1					
S2	Electronic Locks																			B	1								RC							RC							1					
S3	iBag readings																			1	1								1							1							1					
S4	Containers ID																			B	RC								RC							RC							1					
S5	Filling sensor																			B	1								1							1							1					
S6	Weight sensor																			1	1								RC							RC							1					
S7	High speed camera																			B	α								RC							RC							1					
S8	Clean points monitorization																			B	Ø								RC							RC							1					
S9	Community composting plants monitorization																			B	1								RC							RC							1					
S10	Biomass production from food/kitchen waste monitorization																			B	RC								RC							RC							1					
S11	Biofuel and Compost production from disposable nappies monitorization																			B	RC								RC							RC							1					
S12	DIY food waste monitorization																			B	α								RC							RC							1					
S13	Industrial food waste monitorization																			B	α								RC							RC							1					
	IMPLEMENTATION STATUS																																															
	Seveso Pilot																																															
S1	Citizen ID																			T	P								P							P												
S3	iBag readings																			T	P								P							P												
	Cascais Pilot																																															
S1	Citizen ID																			D	I								I							T												
S2	Electronic Locks																			D	T								I							T												
S4	Containers ID																			D	P								I							T												
S5	Filling sensor																			D	T								P							P												
S6	Weight estimation*																			P	P								P							P												
	Zamudio Pilot																																															
S1	Citizen ID																			T	P								I							T												
S2	Electronic Locks																			D	I								I							T												
S4	Containers ID																			D	I								I							T												
S5	Filling sensor (*chamber system + prediction models)																			D	Ø								I							T												
S6	Weight sensor																			D	I								I							T												
S7	High speed camera																			Ø	Ø								I							T												
S8	Clean points monitorization																			D	Ø								I							T												
S9	Community composting plants monitorization																			D	€								I							T												
S12	DIY food waste monitorization																			Ø	€								I							T												
S13	Industrial food waste monitorization																			Ø	€								I							T												
	Halandri Pilot																																															
S4	Containers ID																			D	T								I							T												
S6	Weight sensor																			D	T								I							T												
S9	Community composting plants monitorization																			D	€								I							T												
S10	Biomass production from food/kitchen waste monitorization																			€	T								I							T												
S11	Biofuel and Compost production from disposable nappies monitorization																			€	I								I							T												

STATUS description

Integration of Sensors

Ø	The sensor have not been selected yet or the purchase have not started.
€	A tender, or similar procedure, have been sheduled to acquire the sensors.
D	Sensor have been installed but no integration with the rest of the components have started.
I	Sensors are being integrated with the rest of solutions at the pilot site.
T	Sensors have been deployed and have been integrated. Tests are being carried out in real conditions.
P	Sensors have been deployed and work as expected.

Development

Ø	The device has been designed but it was not started its assembly
α	Not all functionalities are implemented or some of them are in a "Wizard of Oz" type of implementation (the function exists but behaves trivially). Only partial test could be made.
B	All functionalities are implemented but some of them do not behave as expected. Obvious bugs are been found. The system is been tested in lab conditions.
RC	All functionalities are implemented and behaves as expected. Obvious bugs have been ironed out. The system is been tested in real conditions.
1	All functionalities are working as expected. The system have been tested in real conditions.

Annex 2 Level of development and implementation of the Operation and Planning tools expected per period and per pilot based on the fulfillment of every functional requirement and status at Milestone 2.

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		2016											2017											2018											2019											
		1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	#
		Use case analysis						M1					Preparatory Actions											M2	Deployment & Integration								M3	Preliminary Test				M4	Full Test					M5			
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42						
	DEVELOPMENT STATUS																																															
R1_FR1	**To monitor the waste generation**																																														
R1_FR1.1	Allow to identify the users to the collection system																																														
R1_FR1.1.1	Allow to identify the users by an ID card (NFC)																																														
R1_FR1.1.2	Allow to identify the user by an iBag (RFID) (D2D system)																																														
R1_FR1.1.3	Allow to identify the bin by a RFID tag																																														
R1_FR1.2	Monitor the delivery of waste (control access)																																														
R1_FR1.2.1	Control the access to the containers with a black list mechanishm																																														
R1_FR1.2.2	Control the access to the containers with a white list mechanishm																																														
R1_FR1.2.3	Locks must be reprogrammables																																														
R1_FR1.3	Allow to characterize the waste deposited																																														
R1_FR1.3.1	Identify the type of waste deposited (information of manual characterizations)																																														
R1_FR1.3.2	Provide help in the identification of the improper waste when emptying the bin/bag																																														
R1_FR1.3.3	Get the amount of waste deposited																																														
R1_FR1.3.4	Get the time when the waste is generated (deposited or surplus)																																														
R1_FR1.3.5	Get the localization where the waste is deposited																																														
R1_FR1.3.6	Get the number of iBags delivered to users																																														
R1_FR1.3.7	Monitoring the waste deposited in Eco-events																																														
R1_FR1.4	Get information about the state of the deposit point and composting plants																																														
R1_FR1.4.1	Allows the monitorization of the filling level (Bins)																																														
R1_FR1.4.2	Allows the monitorization of the temperature (Composting)																																														
R1_FR1.4.3	Allows the monitorization of the moisture (Composting)																																														
R1_FR1.5	Provide a fallback solution to publish information in the context broker																																														
R1_FR2	**Get information of a collection route**																																														
R1_FR2.1	Get the total fuel consumption of a collection route																																														
R1_FR2.2	Estimate the total environmental impact of a collection route																																														
R1_FR2.3	Get the GPS Trace of a collection route																																														
R1_FR2.4	Get the FMS information from the CAN BUS																																														
R1_FR2.5	Get the total weight of waste collected																																														
R1_FR2.6	Get the places where the bin have been collected																																														
R1_FR2.7	Get the time when the bin have been collected																																														
R1_FR2.8	Allow to emit a certification of the work done during the shift																																														
R1_FR3	**Allow to report issues**																																														
R1_FR3.1	Allow to report the overfill of a container																																														
R1_FR3.2	Allow to report vandalizing of a container																																														
R1_FR3.3	Allow to report incorrect use of a container or bag																																														
R1_FR3.3.1	Allows to report the presence of improper waste																																														
R1_FR3.3.2	Allows to detect if a cointainer is not inventoried																																														
R1_FR3.3.3	Allow to report a missing container																																														
R1_FR3.4	Allow to take evidences (photos or videos) of the incidences																																														
R1_FR3.5	Allow to request of specific collections (bulky waste)																																														
R1_FR4	**To display the state of the waste collection system**																																														
R1_FR4.1	Allow to show the state of the waste collection system																																														
R1_FR4.1.1	Allow to show the {past, current, planned} state of the system																																														
R1_FR4.2	Detect anomalies in the waste generation patterns																																														
R1_FR4.3	Allows to personalize the monitoring system																																														
R1_FR4.3.1	Allows to filter the information provided by time, type and geographical distribution																																														
R1_FR4.3.2	Allows to select and configure the KPIs to show																																														
R1_FR4.3.3	Allows to define alerts																																														
R1_FR4.4	Allows to create automatic reports in PDF, Excel and CSV																																														
R1_FR4.5	The system must be able to crawl the web to get incidences																																														
R1_FR4.5.1	Crawl social networks like Twitter and Facebook																																														
R1_FR4.5.2	Crawl blogs and webpages																																														
R1_FR5	**Provide a system to persist the information**																																														
R1_FR5.1	Provide a communication channel to the persistence solution																																														
R1_FR5.2	Provide a communication channel to CKAN storage systems																																														
R1_FR5.3	Data Transmission to the Server (for MOBA components)																																														
R1_FR5.3.1	Secured data transmission for PAYT																																														
R1_FR5.3.2	Data transmission for real time reporting																																														
R2_FR1	**To manage the waste collection service**																																														
R2_FR1.1	To create the routes to follow every vehicle of the fleet																																														
R2_FR1.1.1	Depending of the fill level of the bins																																														
R2_FR1.1.2	Depending on the incidences declared																																														
R2_FR1.1.3	Depending on the vehicle and driver aviability																																														

	ref	stat	ref	stat	ref	stat	ref	stat
R1_FR1	α	α			Β		RC	1
R1_FR1.1	α	α			Β		RC	1
R1_FR1.1.1	α	α			Β		RC	1
R1_FR1.1.2	1	1			1		1	1
R1_FR1.1.3	α	1			Β		RC	1
R1_FR1.2	α	α			Β		RC	1
R1_FR1.2.1	α	α			Β		RC	1
R1_FR1.2.2	α	α			Β		RC	1
R1_FR1.2.3	α	Ø			Β		RC	1
R1_FR1.3	α	α			Β		RC	1
R1_FR1.3.1	RC	α			1		1	1
R1_FR1.3.2	α	α			Β		RC	1
R1_FR1.3.3	α	α			Β		RC	1
R1_FR1.3.4	α	α			Β		RC	1
R1_FR1.3.5	α	1			Β		RC	1
R1_FR1.3.6	1	1			1		1	1
R1_FR1.3.7	α	Ø			Β		RC	1
R1_FR1.4	α	Ø			Β		RC	1
R1_FR1.4.1	α	Ø			Β		RC	1
R1_FR1.4.2	α	Ø			Β		RC	1
R1_FR1.4.3	α	Ø			Β		RC	1
R1_FR1.5	α	Β			Β		RC	1
R1_FR2					Β		RC	1
R2_FR2.1	α	1			Β		RC	1
R1_FR2.2	α	Β			Β		RC	1
R1_FR2.3	α	1			Β		RC	1
R1_FR2.4	α	1			Β		RC	1
R1_FR2.5	α	1			Β		RC	1
R1_FR2.6	α	1			Β		RC	1
R1_FR2.7	α	1			Β		RC	1
R1_FR2.8	α	α			Β		RC	1
R1_FR3	α	α			Β		RC	1
R1_FR3.1	α	1			Β		RC	1
R1_FR3.2	α	1			Β		RC	1
R1_FR3.3	α	1			Β		RC	1
R1_FR3.3.1	α	1			Β		RC	1
R1_FR3.3.2	α	1			Β		RC	1
R1_FR3.3.3	α	1			Β		RC	1
R1_FR3.4	α	α			Β		RC	1
R1_FR3.5	α	Ø			Β		RC	1
R1_FR4	α	α			Β		RC	1
R1_FR4.1	α	α			Β		RC	1
R1_FR4.1.1	α	α			Β		RC	1
R1_FR4.2	α	Ø			Β		RC	1
R1_FR4.3	α	α			Β		RC	1
R1_FR4.3.1	α	Ø			Β		RC	1
R1_FR4.3.2	α	α			Β		RC	1
R1_FR4.3.3	α	Ø			Β		RC	1
R1_FR4.4	α	Ø			Β		RC	1
R1_FR4.5	α	Ø			Β		RC	1
R1_FR4.5.1	α	Ø			Β		RC	1
R1_FR4.5.2	α	Ø			Β		RC	1
R1_FR5	RC				RC		1	1
R1_FR5.1	RC	α			RC		1	1
R1_FR5.2	RC	α			RC		1	1
R1_FR5.3	Ø	Β			Β		RC	1
R1_FR5.3.1	Ø	α			Β		RC	1
R1_FR5.3.2	Ø	α			Β		RC	1
R2_FR1	α	Β			Β		RC	1
R2_FR1.1	α	RC			Β		RC	1
R2_FR1.1.1	α	1			Β		RC	1
R2_FR1.1.2	α	Β			Β		RC	1
R2_FR1.1.3	α	Ø			Β		RC	1

STATUS description

Deployment

I	Sensors are being integrated with the rest of solutions at the pilot site.
T	Sensors have been deployed and have been integrated. Tests are being carried out in real conditions.
P	Sensors have been deployed and work as expected.

Development

Ø	The device has been designed but it was not started its assembly
α	Not all functionalities are implemented or some of them are in a "Wizard of Oz" type of implementation (the function exists but behaves trivially). Only partial test could be made.
Β	All functionalities are implemented but some of them do not behave as expected. Obvious bugs are been found. The system is been tested in lab conditions.
RC	All functionalities are implemented and behaves as expected. Obvious bugs have been ironed out. The system is been tested in real conditions.
1	All functionalities are working as expected. The system have been tested in real conditions.

		2016											2017											2018											2019											
		1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	#
		Use case analysis					M1	Preparatory Actions														M2	Deployment & Integration								M3	Preliminary Test					M4	Full Test					M5				
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42				
																				ref	stat							ref	stat					ref	stat						ref	stat				
R2_FR1.1.4	Depending on the planned traffic condition																			α	Ø							Ɓ						RC							1				
R2_FR1.2	Optimize the route of the fleet																			α	Ɓ							Ɓ						RC							1				
R2_FR1.2.1	Optimize the route minimizing the time																			α	Ø							Ɓ						RC							1				
R2_FR1.2.2	Optimize the route minimizing the distance																			α	Ø							Ɓ						RC							1				
R2_FR1.2.3	Optimize the route minimizing the cost																			α	Ø							Ɓ						RC							1				
R2_FR1.2.4	Optimize the route minimizing the environmental impact																			α	Ø							Ɓ						RC							1				
R2_FR1.2.5	Optimize the route with any combination of the above																			α	α							Ɓ						RC							1				
R2_FR2	**Provide feedback to drivers**																			α	α							Ɓ						RC							1				
R2_FR2.1	Provide turn-by-turn information to the driver																			α	α							Ɓ						RC							1				
R2_FR2.2	Provide tips to promote more sustainable driving																			α	α							Ɓ						RC							1				
R2_FR3	**Calculate the taxes to be charge to the citizens (invoicing module)**																			Ø	1							Ɓ						RC							1				
R2_FR3.1	Be able to calculate taxes following different PAYT schemes																			Ø	1							Ɓ						RC							1				
R2_FR3.1.1	Be able to calculate taxes following a PAYT scheme including incentives for the use of the different prevention and recycling actions																			Ø	1							Ɓ						RC							1				
R2_FR3.1.2	Be able to calculate taxes following a PAYT scheme base on the amount of waste generated																			Ø	1							Ɓ						RC							1				
R3_FR1	**To support the long term planning**																				α							Ɓ						RC							1				
R3_FR1.1	Provide visual tools to create predictive and explicative models																			α	Ø							Ɓ						RC							1				
R3_FR1.2	Provide visuals tools to help in the creation of baselines and what-if scenarios																			α	α							Ɓ						RC							1				
R3_FR1.2.1	Allow to modify in what-if scenarios the projected population and their spatial distribution																			α	Ø							Ɓ						RC							1				
R3_FR1.2.2	Allow to modify in what-if scenarios the waste type and quantity																			α	α							Ɓ						RC							1				
R3_FR1.2.3	Allow to modify in what-if scenarios the introduction of new treatment plants																			α	Ø							Ɓ						RC							1				
R3_FR1.2.4	Allow to modify in what-if scenarios the introduction of new collection systems																			α	α							Ɓ						RC							1				
R3_FR1.2.5	Allow to modify in what-if scenarios the mean for waste collection (electric truck, etc.)																			α	α							Ɓ						RC							1				
R3_FR1.2.6	Allow to modify in what-if scenarios the localization of the collection spots																			α	α							Ɓ						RC							1				
R3_FR1.2.7	Allow to modify in what-if scenarios the prevention campains																			α	Ø							Ɓ						RC							1				
R3_FR1.2.8	Allow to introduce and / or modify the economic instruments (tariff, PAYT, etc.)																			α	Ø							Ɓ						RC							1				
R3_FR1.3	Perform long term simulations of the waste management system																			α	α							Ɓ						RC							1				
R3_FR1.3.1	Simulate the combination of collection system plus treatment plans																			α	α							Ɓ						RC							1				
R3_FR1.3.2	Simulate the localization and size of the collection points and treatment plans																			α	Ɓ							Ɓ						RC							1				
R3_FR1.3.3	Design and simulate combinations of prevention campains																			α	Ø							Ɓ						RC							1				
R3_FR1.3.4	Take into consideration multiple criteria (economical, environmental and socials impacts)																			α	Ɓ							Ɓ						RC							1				
R3_FR1.3.5	Simulate different transport means for waste collection																			α	Ɓ							Ɓ						RC							1				
R3_FR1.3.6	Simulate the effect of different combination of economic instruments																			α	Ø							Ɓ						RC							1				
R3_FR1.4	Allow the optimization of the waste collection for special events																			α	Ø							Ɓ						RC							1				
R3_FR1.5	Help in the creation of green procurements																			α	Ø							Ɓ						RC							1				
R3_FR1.5.1	To identify criteria for the tendering																			α	Ɓ							Ɓ						RC							1				
R3_FR1.5.2	To evaluate the applicants of the tender																			α	Ø							Ɓ						RC							1				
R4_FR1	**To foster circular economy opportunities**																			α	Ø							Ɓ						RC							1				
R4_FR1.1	Provide recommendation to foster circular economy																			α	α							Ɓ						RC							1				
R4_FR1.1.1	Allow to create baseline and what-if scenarios																			α	α							Ɓ						RC							1				
R4_FR1.1.2	Evaluate the impact that several best practices have to foster circular economy																			α	Ø							Ɓ						RC							1				
R4_FR1.1.3	Search for viable circular economy best practices																			α	Ɓ							Ɓ						RC							1				

	IMPLEMENTATION STATUS																																															
	Seveso Pilot																																															
R1_FR1	**To monitor the waste generation**																																															
R1_FR1.1	Allow to identify the users to the collection system																																															
R1_FR1.1.2	Allow to identify the user by an iBag (RFID)																			I	P							T						T							P					
R1_FR1.3	Allow to characterize the waste deposited																																															
R1_FR1.3.1	Identify the type of waste deposited (information of manual characterizations)																			I	P							P						P							P					
R1_FR1.3.3	Get the amount of waste deposited																			I								T						T							P					
R1_FR1.3.4	Get the time when the waste is generated (deposited or surplus)																			I								T						T							P					
R1_FR1.3.5	Get the localization where the waste is deposited																			I								T						T							P					
R1_FR1.3.6	Get the number of iBags delivered to users																			I	P							T						T							P					
R1_FR1.3.7	Monitoring the waste deposited in Eco-events																											I						T							P					

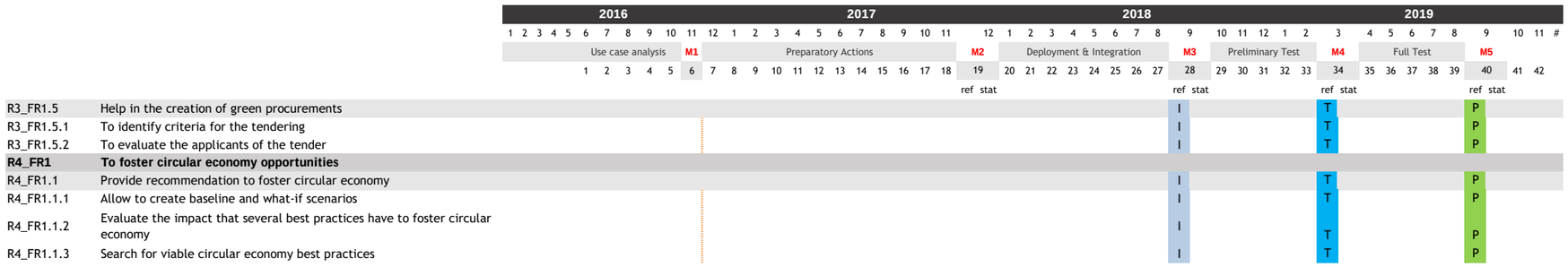
R1_FR1.5	Provide a fallback solution to publish information in the context broker	I T P
R1_FR2	**Get information of a collection route**	
R1_FR2.2	Estimate the total environmental impact of a collection route	I T P
R1_FR2.3	Get the GPS Trace of a collection route	I T P
R1_FR2.5	Get the total weight of waste collected	I T P
R1_FR2.6	Get the places where the bin have been collected	I T P
R1_FR2.7	Get the time when the bin have been collected	I T P
R1_FR3	**Allow to report issues**	
R1_FR3.3	Allow to report incorrect use of a container or bag	I T P
R1_FR3.3.1	Allows to report the presence of improper waste	n/a n/a n/a
R1_FR3.4	Allow to take evidences (photos or videos) of the incidences	I T P
R1_FR4	**To display the state of the waste collection system**	
R1_FR4.1	Allow to show the state of the waste collection system	I T P
R1_FR4.1.1	Allow to show the {past, current, planned} state of the system	I T P
R1_FR4.2	Detect anomalies in the waste generation patterns	I T P
R1_FR4.3	Allows to personalize the monitoring system	I T P
R1_FR4.3.1	Allows to filter the information provided by time, type and geographical distribution	I T P
R1_FR4.3.2	Allows to select and configure the KPIs to show	I T P
R1_FR4.3.3	Allows to define alerts	I T P
R1_FR4.4	Allows to create automatic reports in PDF, Excel and CSV	I T P
R1_FR4.5	The system must be able to crawl the web to get incidences	I T P
R1_FR4.5.1	Crawl social networks like Twitter and Facebook	I T P
R1_FR4.5.2	Crawl blogs and webpages	I T P
R1_FR5	**Provide a system to persist the information**	
R1_FR5.1	Provide a communication channel to the persistence solution	I T P
R1_FR5.2	Provide a communication channel to CKAN storage systems	I T P
R1_FR5.3	Data Transmission to the Server	I T P
R1_FR5.3.1	Secured data transmission for PAYT	I T P
R1_FR5.3.2	Data transmission for real time reporting	I T P
R2_FR3	**Calculate the taxes to be charge to the citizens (invoicing module)**	P
R2_FR3.1	Be able to calculate taxes following different PAYT schemes	P I T P
R2_FR3.1.1	Be able to calculate taxes following a PAYT scheme including incentives for the use of the different prevention and recycling actions	P I T P
R2_FR3.1.2	Be able to calculate taxes following a PAYT scheme base on the amount of waste generated	P I T P
R3_FR1	**To support the long term planning**	
R3_FR1.1	Provide visual tools to create predictive and explicative models	I T P
R3_FR1.2	Provide visuals tools to help in the creation of baselines and what-if scenarios	I T P
R3_FR1.2.1	Allow to modify in what-if scenarios the projected population and their spatial distribution	I T P
R3_FR1.2.2	Allow to modify in what-if scenarios the waste type and quantity	I T P
R3_FR1.2.3	Allow to modify in what-if scenarios the introduction of new treatment plants	I T P
R3_FR1.2.4	Allow to modify in what-if scenarios the introduction of new collection systems	I T P
R3_FR1.2.5	Allow to modify in what-if scenarios the mean for waste collection (electric truck, etc.)	I T P
R3_FR1.2.6	Allow to modify in what-if scenarios the localization of the collection spots	I T P
R3_FR1.2.7	Allow to modify in what-if scenarios the prevention campains	I T P
R3_FR1.2.8	Allow to introduce and / or modify the economic instruments (tariff, PAYT, etc.)	I T P
R3_FR1.3	Perform long term simulations of the waste management system	I T P
R3_FR1.3.1	Simulate the combination of collection system plus treatment plans	I T P
R3_FR1.3.2	Simulate the localization and size of the collection points and treatment plans	I T P
R3_FR1.3.3	Design and simulate combinations of prevention campains	I T P
R3_FR1.3.4	Take into consideration multiple criteria (economical, environmental and socials impacts)	I T P
R3_FR1.3.5	Simulate different transport means for waste collection	I T P
R3_FR1.3.6	Simulate the effect of different combination of economic instruments	I T P
R3_FR1.4	Allow the optimization of the waste collection for special events	I T P
R3_FR1.5	Help in the creation of green procurements	I T P
R3_FR1.5.1	To identify criteria for the tendering	I T P
R3_FR1.5.2	To evaluate the applicants of the tender	I T P
R4_FR1	**To foster circular economy opportunities**	
R4_FR1.1	Provide recommendation to foster circular economy	I T P

		2016											2017											2018											2019											
		1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	#
		Use case analysis					M1	Preparatory Actions														M2	Deployment & Integration								M3	Preliminary Test				M4	Full Test					M5					
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42					
																				ref	stat								ref	stat					ref	stat											
R4_FR1.1.1	Allow to create baseline and what-if scenarios																												I						T						P					
R4_FR1.1.2	Evaluate the impact that several best practices have to foster circular economy																												I						T						P					
R4_FR1.1.3	Search for viable circular economy best practices																												I						T						P					
	Cascais Pilot																																														
R1_FR1	**To monitor the waste generation**																																														
R1_FR1.1	Allow to identify the users to the collection system																																														
R1_FR1.1.1	Allow to identify the users by an ID card (NFC)																												I						T						P					
R1_FR1.1.3	Allow to identify the bin by a RFID tag (D2D system)																			P									I						T						P					
R1_FR1.2	Monitor the delivery of waste (control access)																																														
R1_FR1.2.1	Control the access to the containers with a black list mechanishm																												I						T						P					
R1_FR1.2.2	Control the access to the containers with a white list mechanishm																												I						T						P					
R1_FR1.2.3	Locks must be reprogrammables																												I						T						P					
R1_FR1.3	Allow to characterize the waste deposited																																														
R1_FR1.3.1	Identify the type of waste deposited (information of manual characterizations)																			I									P						P						P					
R1_FR1.3.3	Get the amount of waste deposited																												I						T						P					
R1_FR1.3.4	Get the time when the waste is generated (deposited or surplus)																												I						T						P					
R1_FR1.3.5	Get the localization where the waste is deposited																			P									I						T						P					
R1_FR1.4	Get information about the state of the deposit point and composting plants																																														
R1_FR1.4.1	Allows the monitorization of the filling level (Bins)																												I						T						P					
R1_FR1.5	Provide a fallback solution to publish information in the context broker																												I						T						P					
R1_FR2	**Get information of a collection route**																																														
R1_FR2.1	Get the total fuel consumption of a collection route																												I						T						P					
R1_FR2.2	Estimate the total environmental impact of a collection route																												I						T						P					
R1_FR2.3	Get the GPS Trace of a collection route																			P									I						T						P					
R1_FR2.4	Get the FMS information from the CAN BUS																												I						T						P					
R1_FR2.6	Get the places where the bin have been collected																			P									I						T						P					
R1_FR2.7	Get the time when the bin have been collected																			P									I						T						P					
R1_FR2.8	Allow to emit a certification of the work done during the shift																												I						T						P					
R1_FR3	**Allow to report issues**																																														
R1_FR3.1	Allow to report the overfill of a container																												I						T						P					
R1_FR3.2	Allow to report vandalizing of a container																												I						T						P					
R1_FR3.3	Allow to report incorrect use of a container or bag																												I						T						P					
R1_FR3.3.1	Allows to report the presence of improper waste																												I						T						P					
R1_FR3.3.2	Allows to detect if a cointainer is not inventoried																												I						T						P					
R1_FR3.3.3	Allow to report a missing container																												I						T						P					
R1_FR3.4	Allow to take evidences (photos or videos) of the incidences																												I						T						P					
R1_FR4	**To display the state of the waste collection system**																																														
R1_FR4.1	Allow to show the state of the waste collection system																												I						T						P					
R1_FR4.1.1	Allow to show the {past, current, planned} state of the system																												I						T						P					
R1_FR4.2	Detect anomalies in the waste generation patterns																												I						T						P					
R1_FR4.3	Allows to personalize the monitoring system																												I						T						P					
R1_FR4.3.1	Allows to filter the information provided by time, type and geographical distribution																												I						T						P					
R1_FR4.3.2	Allows to select and configure the KPIs to show																												I						T						P					
R1_FR4.3.3	Allows to define alerts																												I						T						P					
R1_FR4.4	Allows to create automatic reports in PDF, Excel and CSV																												I						T						P					
R1_FR4.5	The system must be able to crawl the web to get incidences																												I						T						P					
R1_FR4.5.1	Crawl social networks like Twitter and Facebook																												I						T						P					
R1_FR4.5.2	Crawl blogs and webpages																												I						T						P					
R1_FR5	**Provide a system to persist the information**																																														
R1_FR5.1	Provide a communication channel to the persistence solution																												I						T						P					
R1_FR5.2	Provide a communication channel to CKAN storage systems																												I						T						P					
R1_FR5.3	Data Transmission to the Server (for MOBA components)																												I						T						P					
R1_FR5.3.1	Secured data transmission for PAYT																												I						T						P					
R1_FR5.3.2	Data transmission for real time reporting																												I						T						P					
R2_FR1	**To manage the waste collection service**																																														
R2_FR1.1	To create the routes to follow every vehicle of the fleet																			P									I						T						P					
R2_FR1.1.1	Depending of the fill level of the bins																			P									I						T						P					
R2_FR1.1.2	Depending on the incidences declared																												I						T						P					
R2_FR1.1.3	Depending on the vehicle and driver aviability																												I						T						P					
R2_FR1.1.4	Depending on the planned traffic condition																												I						T						P					
R2_FR1.2	Optimize the route of the fleet																												I						T						P					
R2_FR1.2.1	Optimize the route minimizing the time																												I						T						P					
R2_FR1.2.2	Optimize the route minimizing the distance																												I						T						P					
R2_FR1.2.3	Optimize the route minimizing the cost																												I						T						P					
R2_FR1.2.4	Optimize the route minimizing the environmental impact																												I						T						P					
R2_FR1.2.5	Optimize the route with any combination of the above																												I						T						P					
R2_FR2	**Provide feedback to drivers**																																														
R2_FR2.1	Provide turn-by-turn information to the driver																												I						T						P					

		2016											2017												2018												2019											
		1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	#
		Use case analysis										M1	Preparatory Actions											M2	Deployment & Integration								M3	Preliminary Test				M4	Full Test				M5			
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42				
																												ref	stat					ref	stat					ref	stat							
R2_FR2.2	Provide tips to promote more sustainable driving																												I					T					P							
R2_FR3	**Calculate the taxes to be charge to the citizens (invoicing module)**																																														
R2_FR3.1	Be able to calculate taxes following different PAYT schemes																												I					T					P							
R2_FR3.1.1	Be able to calculate taxes following a PAYT scheme including incentives for the use of the different prevention and recycling actions																												I					T					P							
R2_FR3.1.2	Be able to calculate taxes following a PAYT scheme base on the amount of waste generated																												I					T					P							
R3_FR1	**To support the long term planning**																																														
R3_FR1.1	Provide visual tools to create predictive and explicative models																												I					T					P							
R3_FR1.2	Provide visuals tools to help in the creation of baselines and what-if scenarios																												I					T					P							
R3_FR1.2.1	Allow to modify in what-if scenarios the projected population and their spatial distribution																												I					T					P							
R3_FR1.2.2	Allow to modify in what-if scenarios the waste type and quantity																												I					T					P							
R3_FR1.2.3	Allow to modify in what-if scenarios the introduction of new treatment plants																												I					T					P							
R3_FR1.2.4	Allow to modify in what-if scenarios the introduction of new collection systems																												I					T					P							
R3_FR1.2.5	Allow to modify in what-if scenarios the mean for waste collection (electric truck, etc.)																												I					T					P							
R3_FR1.2.6	Allow to modify in what-if scenarios the localization of the collection spots																												I					T					P							
R3_FR1.2.7	Allow to modify in what-if scenarios the prevention campains																												I					T					P							
R3_FR1.2.8	Allow to introduce and / or modify the economic instruments (tariff, PAYT, etc.)																												I					T					P							
R3_FR1.3	Perform long term simulations of the waste management system																												I					T					P							
R3_FR1.3.1	Simulate the combination of collection system plus treatment plans																												I					T					P							
R3_FR1.3.2	Simulate the localization and size of the collection points and treatment plans																												I					T					P							
R3_FR1.3.3	Design and simulate combinations of prevention campains																												I					T					P							
R3_FR1.3.4	Take into consideration multiple criteria (economical, environmental and socials impacts)																												I					T					P							
R3_FR1.3.5	Simulate different transport means for waste collection																												I					T					P							
R3_FR1.3.6	Simulate the effect of different combination of economic instruments																												I					T					P							
R3_FR1.4	Allow the optimization of the waste collection for special events																												I					T					P							
R3_FR1.5	Help in the creation of green procurements																												I					T					P							
R3_FR1.5.1	To identify criteria for the tendering																												I					T					P							
R3_FR1.5.2	To evaluate the applicants of the tender																												I					T					P							
R4_FR1	**To foster circular economy opportunities**																																														
R4_FR1.1	Provide recommendation to foster circular economy																												I					T					P							
R4_FR1.1.1	Allow to create baseline and what-if scenarios																												I					T					P							
R4_FR1.1.2	Evaluate the impact that several best practices have to foster circular economy																												I					T					P							
R4_FR1.1.3	Search for viable circular economy best practices																												I					T					P							
	Zamudio Pilot																																														
R1_FR1	**To monitor the waste generation**																																														
R1_FR1.1	Allow to identify the users to the collection system																																														
R1_FR1.1.1	Allow to identify the users by an ID card (NFC)																												I					T					P							
R1_FR1.1.3	Allow to identify the bin by a RFID tag																												I					T					P							
R1_FR1.2	Monitor the delivery of waste (control access)																																														
R1_FR1.2.1	Control the access to the containers with a black list mechanishm																												I					T					P							
R1_FR1.2.3	Locks must be reprogrammables																												I					T					P							
R1_FR1.3	Allow to characterize the waste deposited																																														
R1_FR1.3.1	Identify the type of waste deposited (information of manual characterizations)																							I					P					P					P							
R1_FR1.3.2	Provide help in the identification of the improper waste when emptying the bin/bag																												I					T					P							
R1_FR1.3.3	Get the amount of waste deposited																							I					I					T					P							
R1_FR1.3.4	Get the time when the waste is generated (deposited or surplus)																												I					T					P							
R1_FR1.3.5	Get the localization where the waste is deposited																												I					T					P							
R1_FR1.3.7	Monitoring the waste deposited in Eco-events																												I					T					P							
R1_FR1.4	Get information about the state of the deposit point and composting plants																																														
R1_FR1.4.2	Allows the monitorization of the temperature (Composting)																												I					T					P							
R1_FR1.4.3	Allows the monitorization of the moisture (Composting)																												I					T					P							
R1_FR1.5	Provide a fallback solution to publish information in the context broker																												I					T					P							
R1_FR2	**Get information of a collection route**																																														
R1_FR2.2	Estimate the total environmental impact of a collection route																												I					T					P							

		2016											2017											2018											2019											
		1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	#
		Use case analysis					M1	Preparatory Actions											M2	Deployment & Integration									M3	Preliminary Test					M4	Full Test					M5							
							1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42
																									ref	stat							ref	stat					ref	stat					ref	stat			
R1_FR2.3	Get the GPS Trace of a collection route																																I						T						P			
R1_FR2.5	Get the total weight of waste collected																																I						T						P			
R1_FR2.6	Get the places where the bin have been collected																																I						T						P			
R1_FR2.7	Get the time when the bin have been collected																																I						T						P			
R1_FR3	**Allow to report issues**																																															
R1_FR3.1	Allow to report the overfill of a container																																I						T						P			
R1_FR3.2	Allow to report vandalizing of a container																																I						T						P			
R1_FR3.3	Allow to report incorrect use of a container or bag																																I						T						P			
R1_FR3.3.1	Allows to report the presence of improper waste																																I						T						P			
R1_FR3.3.2	Allows to detect if a cointainer is not inventoried																																I						T						P			
R1_FR3.3.3	Allow to report a missing container																																I						T						P			
R1_FR3.4	Allow to take evidences (photos or videos) of the incidences																																I						T						P			
R1_FR3.5	Allow to request of specific collections (bulky waste)																																I						T						P			
R1_FR4	**To display the state of the waste collection system**																																															
R1_FR4.1	Allow to show the state of the waste collection system																																I						T						P			
R1_FR4.1.1	Allow to show the {past, current, planned} state of the system																																I						T						P			
R1_FR4.2	Detect anomalies in the waste generation patterns																																I						T						P			
R1_FR4.3	Allows to personalize the monitoring system																																I						T						P			
R1_FR4.3.1	Allows to filter the information provided by time, type and geographical distribution																																I						T						P			
R1_FR4.3.2	Allows to select and configure the KPIs to show																																I						T						P			
R1_FR4.3.3	Allows to define alerts																																I						T						P			
R1_FR4.4	Allows to create automatic reports in PDF, Excel and CSV																																I						T						P			
R1_FR4.5	The system must be able to crawl the web to get incidences																																I						T						P			
R1_FR4.5.1	Crawl social networks like Twitter and Facebook																																I						T						P			
R1_FR4.5.2	Crawl blogs and webpages																																I						T						P			
R1_FR5	**Provide a system to persist the information**																																															
R1_FR5.1	Provide a communication channel to the persistence solution																																I						T						P			
R1_FR5.2	Provide a communication channel to CKAN storage systems																																I						T						P			
R1_FR5.3	Data Transmission to the Server																																I						T						P			
R1_FR5.3.1	Secured data transmission for PAYT																																						T						P			
R1_FR5.3.2	Data transmission for real time reporting																																						T						P			
R2_FR3	**Calculate the taxes to be charge to the citizens (invoicing module)**																																															
R2_FR3.1	Be able to calculate taxes following different PAYT schemes																																I						T						P			
R2_FR3.1.1	Be able to calculate taxes following a PAYT scheme including incentives for the use of the different prevention and recycling actions																																I						T						P			
R2_FR3.1.2	Be able to calculate taxes following a PAYT scheme base on the amount of waste generated																																I						T						P			
R3_FR1	**To support the long term planning**																																															
R3_FR1.1	Provide visual tools to create predictive and explicative models																																I						T						P			
R3_FR1.2	Provide visuals tools to help in the creation of baselines and what-if scenarios																																I						T						P			
R3_FR1.2.1	Allow to modify in what-if scenarios the projected population and their spatial distribution																																I						T						P			
R3_FR1.2.2	Allow to modify in what-if scenarios the waste type and quantity																																I						T						P			
R3_FR1.2.3	Allow to modify in what-if scenarios the introduction of new treatment plants																																I						T						P			
R3_FR1.2.4	Allow to modify in what-if scenarios the introduction of new collection systems																																I						T						P			
R3_FR1.2.5	Allow to modify in what-if scenarios the mean for waste collection (electric truck, etc.)																																I						T						P			
R3_FR1.2.6	Allow to modify in what-if scenarios the localization of the collection spots																																I						T						P			
R3_FR1.2.7	Allow to modify in what-if scenarios the prevention campains																																I						T						P			
R3_FR1.2.8	Allow to introduce and / or modify the economic instruments (tariff, PAYT, etc.)																																I						T						P			
R3_FR1.3	Perform long term simulations of the waste management system																																I						T						P			
R3_FR1.3.1	Simulate the combination of collection system plus treatment plans																																I						T						P			
R3_FR1.3.2	Simulate the localization and size of the collection points and treatment plans																																I						T						P			
R3_FR1.3.3	Design and simulate combinations of prevention campains																																I						T						P			
R3_FR1.3.4	Take into consideration multiple criteria (economical, environmental and socials impacts)																																I						T						P			
R3_FR1.3.5	Simulate different transport means for waste collection																																I						T						P			
R3_FR1.3.6	Simulate the effect of different combination of economic instruments																																I						T						P			
R3_FR1.4	Allow the optimization of the waste collection for special events																																I						T						P			
R3_FR1.5	Help in the creation of green procurements																																I						T						P			
R3_FR1.5.1	To identify criteria for the tendering																																I						T						P			
R3_FR1.5.2	To evaluate the applicants of the tender																																I						T						P			
R4_FR1	**To foster circular economy opportunities**																																															

		2016											2017												2018												2019											
		1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	#
		Use case analysis										M1	Preparatory Actions											M2	Deployment & Integration										M3	Preliminary Test					M4	Full Test				M5			
							1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42
																									ref	stat								ref	stat						ref	stat					ref	stat		
R4_FR1.1	Provide recommendation to foster circular economy																																	I							T					P			
R4_FR1.1.1	Allow to create baseline and what-if scenarios																																	I							T					P			
R4_FR1.1.2	Evaluate the impact that several best practices have to foster circular economy																																	I							T					P			
R4_FR1.1.3	Search for viable circular economy best practices																																	I							T					P			
	Halandri Pilot																																																
R1_FR1	**To monitor the waste generation**																																																
R1_FR1.1	Allow to identify the users to the collection system																																																
R1_FR1.1.3	Allow to identify the bin by a RFID tag																																	I							T					P			
R1_FR1.3	Allow to characterize the waste deposited																																																
R1_FR1.3.1	Identify the type of waste deposited (information of manual characterizations)																							I	I									P							P					P			
R1_FR1.5	Provide a fallback solution to publish information in the context broker																																	I							T					P			
R1_FR2	**Get information of a collection route**																																																
R1_FR2.2	Estimate the total environmental impact of a collection route																																	I							T					P			
R1_FR2.3	Get the GPS Trace of a collection route																																	I							T					P			
R1_FR2.5	Get the total weight of waste collected																																	I							T					P			
R1_FR2.6	Get the places where the bin have been collected																																	I							T					P			
R1_FR2.7	Get the time when the bin have been collected																																	I							T					P			
R1_FR3	**Allow to report issues**																																																
R1_FR3.1	Allow to report the overfill of a container																																	I							T					P			
R1_FR3.2	Allow to report vandalizing of a container																																	I							T					P			
R1_FR3.3	Allow to report incorrect use of a container or bag																																	I							T					P			
R1_FR3.3.1	Allows to report the presence of improper waste																																	I							T					P			
R1_FR3.3.2	Allows to detect if a cointainer is not inventoried																																	I							T					P			
R1_FR3.3.3	Allow to report a missing container																																	I							T					P			
R1_FR3.4	Allow to take evidences (photos or videos) of the incidences																																	I							T					P			
R1_FR4	**To display the state of the waste collection system**																																																
R1_FR4.1	Allow to show the state of the waste collection system																																	I							T					P			
R1_FR4.1.1	Allow to show the {past, current, planned} state of the system																																	I							T					P			
R1_FR4.2	Detect anomalies in the waste generation patterns																																	I							T					P			
R1_FR4.3	Allows to personalize the monitoring system																																	I							T					P			
R1_FR4.3.1	Allows to filter the information provided by time, type and geographical distribution																																	I							T					P			
R1_FR4.3.2	Allows to select and configure the KPIs to show																																	I							T					P			
R1_FR4.3.3	Allows to define alerts																																	I							T					P			
R1_FR4.4	Allows to create automatic reports in PDF, Excel and CSV																																	I							T					P			
R1_FR4.5	The system must be able to crawl the web to get incidences																																	I							T					P			
R1_FR4.5.1	Crawl social networks like Twitter and Facebook																																	I							T					P			
R1_FR4.5.2	Crawl blogs and webpages																																	I							T					P			
R1_FR5	**Provide a system to persist the information**																																																
R1_FR5.1	Provide a communication channel to the persistence solution																																	I							T					P			
R1_FR5.2	Provide a communication channel to CKAN storage systems																																	I							T					P			
R3_FR1	**To support the long term planning**																																																
R3_FR1.1	Provide visual tools to create predictive and explicative models																																	I							T					P			
R3_FR1.2	Provide visuals tools to help in the creation of baselines and what-if scenarios																																	I							T					P			
R3_FR1.2.1	Allow to modify in what-if scenarios the projected population and their spatial distribution																																	I							T					P			
R3_FR1.2.2	Allow to modify in what-if scenarios the waste type and quantity																																	I							T					P			
R3_FR1.2.3	Allow to modify in what-if scenarios the introduction of new treatment plants																																	I							T					P			
R3_FR1.2.4	Allow to modify in what-if scenarios the introduction of new collection systems																																	I							T					P			
R3_FR1.2.5	Allow to modify in what-if scenarios the mean for waste collection (electric truck, etc.)																																	I							T					P			
R3_FR1.2.6	Allow to modify in what-if scenarios the localization of the collection spots																																	I							T					P			
R3_FR1.2.7	Allow to modify in what-if scenarios the prevention campains																																	I							T					P			
R3_FR1.2.8	Allow to introduce and / or modify the economic instruments (tariff, PAYT, etc.)																																	I							T					P			
R3_FR1.3	Perform long term simulations of the waste management system																																	I							T					P			
R3_FR1.3.1	Simulate the combination of collection system plus treatment plans																																	I							T					P			
R3_FR1.3.2	Simulate the localization and size of the collection points and treatment plans																																	I							T					P			
R3_FR1.3.3	Design and simulate combinations of prevention campains																																	I							T					P			
R3_FR1.3.4	Take into consideration multiple criteria (economical, environmental and socials impacts)																																	I							T					P			
R3_FR1.3.5	Simulate different transport means for waste collection																																	I							T					P			
R3_FR1.3.6	Simulate the effect of different combination of economic instruments																																	I							T					P			
R3_FR1.4	Allow the optimization of the waste collection for special events																																	I							T					P			



R3_FR1.5	Help in the creation of green procurements	I T P
R3_FR1.5.1	To identify criteria for the tendering	I T P
R3_FR1.5.2	To evaluate the applicants of the tender	I T P
R4_FR1	**To foster circular economy opportunities**	
R4_FR1.1	Provide recommendation to foster circular economy	I T P
R4_FR1.1.1	Allow to create baseline and what-if scenarios	I T P
R4_FR1.1.2	Evaluate the impact that several best practices have to foster circular economy	I T P
R4_FR1.1.3	Search for viable circular economy best practices	I T P

Annex 3 Level of development and implementation of the Apps expected per period and per pilot based on the fulfillment of every functional requirement and status at Milestone 2

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The dissemination of results herein reflects only the author's view and the European Commission is not responsible for any use that may be made of the information it contains

		2016											2017												2018												2019											
		1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
		Use case analysis					M1	Preparatory Actions											M2	Deployment & Integration									M3	Preliminary Test				M4	Full Test					M5								
							1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42
																									ref	stat								ref	stat										ref	stat			
	DEVELOPMENT STATUS																																															
R5-6-7_FR1	**Common functional requirements of the apps**																								α	α								ß					RC								1			
R5-6-7_FR1.1	There are four profiles of users: generator, receptor, public administration, root																								α	α								ß					RC								1			
R5-6-7_FR1.1.1	The system should be able to use the municipal authentication system																								α	α								ß					RC								1			
R5-6-7_FR1.1.2	The system should be able to use OpenID authentication system																								α	α								ß					RC								1			
R5-6-7_FR1.1.3	The system should be able to use the authorization system of Android and iOS																								α	α								ß					RC								1			
R5-6-7_FR1.2	Provide aggregated information to R1_FR4.1																								α	α								ß					RC								1			
R5-6-7_FR1.2.1	Provide aggregated information about the prevention campaigns to the monitoring system (R1_FR4.1)																								α	α								ß					RC								1			
R5-6-7_FR1.2.2	Provide aggregated information about the use of the app to the monitoring system (R1_FR4.1)																								α	α								ß					RC								1			
R5_FR1	**Coordinate the collection of food for social kitchens to reduce the edible food waste**																								α	α								ß					RC								1			
R5_FR1.2	To characterize the edible food waste (for domestic generators)																								α	α								ß					RC								1			
R5_FR1.2.1	Identify the generator																								α	α								ß					RC								1			
R5_FR1.2.2	Identify the place where the surplus is generated																								α	α								ß					RC								1			
R5_FR1.2.3	Record the time of publication of the surplus alert																								α	α								ß					RC								1			
R5_FR1.2.4	Assess the quality of the food waste																								α	α								ß					RC								1			
R5_FR1.2.4.1	Identify the type of food (cereals, roots and tubers, oil crops and pulses, fruits and vegetables, meat, fish or dairy)																								α	α								ß					RC								1			
R5_FR1.2.4.2	Identify if it was cooked/uncooked																								α	α								ß					RC								1			
R5_FR1.2.4.3	Identify the type of preservation that the food has had. The process comprising the most important steps from purchasing to handling leftovers (cold chain, food maintenance or cooking time, if applicable).																								α	α								ß					RC								1			
R5_FR1.2.4.4	Identify the reason for its discarding (overproduction, spoilage, trim waste, sell-by date expired, best before date expired, aesthetic reasons, other)																								α	α								ß					RC								1			
R5_FR1.2.4.5	Identify other relevant information (organic product)																								α	α								ß					RC								1			
R5_FR1.3	Provide suggestion of all the actions that can be done with the food waste																								α	α								ß					RC								1			
R5_FR1.3.1	Send the surplus alert to potential receptors																								α	α								ß					RC								1			
R5_FR1.3.2	Provide information on the nearest collection point (composting or valorization)																								α	α								ß					RC								1			
R5_FR1.3.3	Suggest recipes to reuse the food waste																								α	α								ß					RC								1			
R5_FR1.4	To record the traceability of all the transactions																								α	α								ß					RC								1			
R5_FR1.5	Analyze the food waste production to give personalized tips for improving the purchase and consumption of food																								α	α								ß					RC								1			
R6_FR1	**To foster local trade, recycling and mutual learning**																								α	α								ß					RC								1			
R6_FR1.1	Provide information about the way to get vouchers																								α	α								ß					RC								1			
R6_FR1.2	Provide information about where to redeem the vouchers																								α	α								ß					RC								1			
R6_FR1.3	Provide information about the environmental impact of product and services																								α	α								ß					RC								1			
R6_FR1.4	Get and send information about the business that have implemented good practices																								α	α								ß					RC								1			
R6_FR1.5	Provide information about local cooperative actions to prevent the generation of waste																								α	α								ß					RC								1			
R6_FR1.5.1	Get the localization of the community composting sites																								α	α								ß					RC								1			
R6_FR1.5.2	Get the localization of the collection of reusable nappies																								α	α								ß					RC								1			
R6_FR1.5.3	Allow to report new collaborative prevention actions and good practices that are being carried on																								α	α								ß					RC								1			
R6_FR1.5.4	Provide aggregated information about the participation in cooperative actions to R1_FR4.1																								α	α								ß					RC								1			
R6_FR1.5.5	Provide integration with others providers of recycling products like Wallapop, Chiclfy, Vibbo, Milanuncios, etc.																								α	α								ß					RC								1			
R7_FR1	**To foster transparency and citizen participation**																								α	α								ß					RC								1			
R7_FR1.1	Show information about the waste management system																								α	α								ß					RC								1			
R7_FR1.1.1	Show the public information about the state of the waste management system (R1_FR4.1)																								α	α								ß					RC								1			
R7_FR1.1.2	Localization of the nearest collection point																								α	α								ß					RC								1			
R7_FR1.1.3	Localization of the clean points																								α	α								ß					RC								1			
R7_FR1.2	Allow to report incidences from mobile devices (R1_FR3)																								α	α								ß					RC								1			
R7_FR1.3	Provide information to reduce the footprint																								α	α								ß					RC								1			
R7_FR1.3.1	Provide information to reduce the amount of waste generated																								α	α								ß					RC								1			
R7_FR1.3.2	Provide information about the correct way of sorting waste																								α	α								ß					RC								1			
R7_FR1.4	Provide information about the PAYT system implemented																								α	α								ß					RC								1			
R7_FR1.5	Provide access to the invoices																								α	α								ß					RC								1			
R7_FR1.5.1	Review the vouchers received and redeemed so far																								α	α								ß					RC								1			
R7_FR1.5.2	Provide a gamification experiences to improve the awareness of the citizens																								α	α								ß					RC								1			

	IMPLEMENTATION STATUS		
	Seveso Pilot		
R5-6-7_FR1	**Common functional requirements of the apps**	I	P
R5-6-7_FR1.1	There are four profiles of users: generator, receptor, public administration, root	I	P
R5-6-7_FR1.1.1	The system should be able to use the municipal authentication system	I	P
R5-6-7_FR1.1.2	The system should be able to use OpenID authentication system	I	P

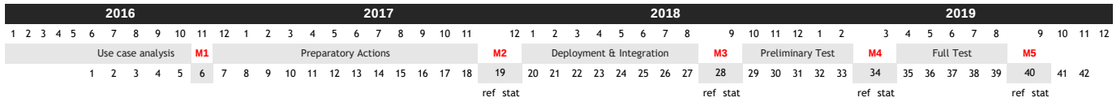
STATUS description

Deployment

I	Sensors are being integrated with the rest of solutions at the pilot site.
T	Sensors have been deployed and have been integrated. Tests are being carried out in real conditions.
P	Sensors have been deployed and work as expected.

Development

Ø	The device has been designed but it was not started its assembly
α	Not all functionalities are implemented or some of them are in a "Wizard of Oz" type of implementation (the function exists but behaves trivially). Only partial test could be made.
ß	All functionalities are implemented but some of them do not behave as expected. Obvious bugs are been found. The system is been tested in lab conditions.
RC	All functionalities are implemented and behaves as expected. Obvious bugs have been ironed out. The system is been tested in real conditions.
1	All functionalities are working as expected. The system have been tested in real conditions.



R5-6-7_FR1.1.3	The system should be able to use the authorization system of Android and iOS	
R5-6-7_FR1.2	Provide aggregated information to R1_FR4.1	
R5-6-7_FR1.2.1	Provide aggregated information about the prevention campaigns to the monitoring system (R1_FR4.1)	
R5-6-7_FR1.2.2	Provide aggregated information about the use of the app to the monitoring system (R1_FR4.1)	
R7_FR1	**To foster transparency and citizen participation**	
R7_FR1.1	Show information about the waste management system	
R7_FR1.1.1	Show the public information about the state of the waste management system (R1_FR4.1)	
R7_FR1.1.2	Localization of the nearest collection point	
R7_FR1.1.3	Localization of the clean points	
R7_FR1.2	Allow to report incidences from mobile devices (R1_FR3)	
R7_FR1.3	Provide information to reduce the footprint	
R7_FR1.3.1	Provide information to reduce the amount of waste generated	
R7_FR1.3.2	Provide information about the correct way of sorting waste	
R7_FR1.4	Provide information about the PAYT system implemented	
R7_FR1.5	Provide access to the invoices	
R7_FR1.5.2	Provide a gamification experiences to improve the awareness of the citizens	
	Cascais Pilot	
R5-6-7_FR1	**Common functional requirements of the apps**	
R5-6-7_FR1.1	There are four profiles of users: generator, receptor, public administration, root	
R5-6-7_FR1.1.1	The system should be able to use the municipal authentication system	
R5-6-7_FR1.1.2	The system should be able to use OpenID authentication system	
R5-6-7_FR1.1.3	The system should be able to use the authorization system of Android and iOS	
R5-6-7_FR1.2	Provide aggregated information to R1_FR4.1	
R5-6-7_FR1.2.1	Provide aggregated information about the prevention campaigns to the monitoring system (R1_FR4.1)	
R5-6-7_FR1.2.2	Provide aggregated information about the use of the app to the monitoring system (R1_FR4.1)	
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R7_FR1.3	Provide information to reduce the footprint	
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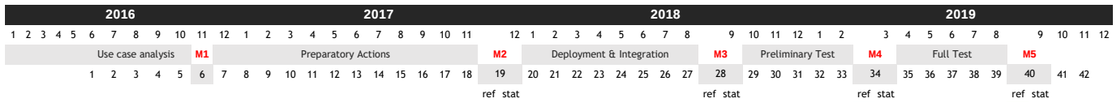
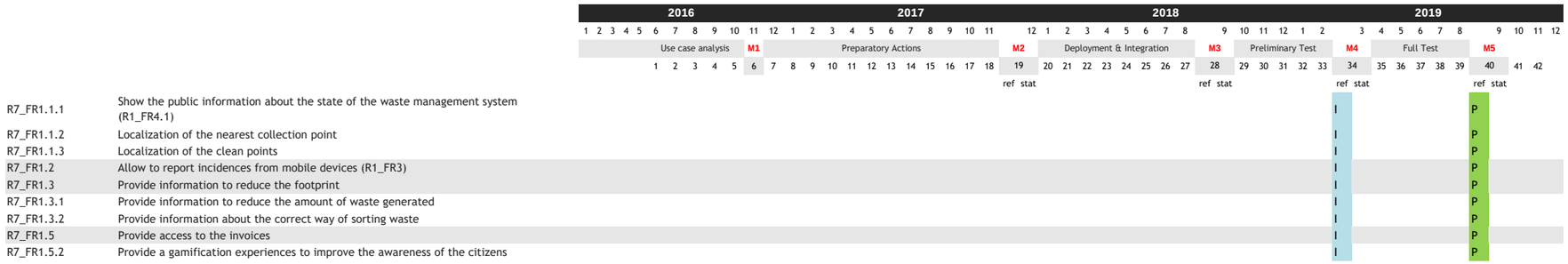
R7_FR1.4	Provide information about the PAYT system implemented	
R7_FR1.5	Provide access to the invoices	
R7_FR1.5.2	Provide a gamification experiences to improve the awareness of the citizens	
	Zamudio Pilot	
R5-6-7_FR1	**Common functional requirements of the apps**	
R5-6-7_FR1.1	There are four profiles of users: generator, receptor, public administration, root	
R5-6-7_FR1.1.1	The system should be able to use the municipal authentication system	
R5-6-7_FR1.1.2	The system should be able to use OpenID authentication system	
R5-6-7_FR1.1.3	The system should be able to use the authorization system of Android and iOS	
R5-6-7_FR1.2	Provide aggregated information to R1_FR4.1	
R5-6-7_FR1.2.1	Provide aggregated information about the prevention campaigns to the monitoring system (R1_FR4.1)	
R5-6-7_FR1.2.2	Provide aggregated information about the use of the app to the monitoring system (R1_FR4.1)	
R5_FR1	**Coordinate the collection of food for social kitchens to reduce the edible food waste**	
R5_FR1.2	To characterize the edible food waste (for domestic generators)	
R5_FR1.2.1	Identify the generator	
R5_FR1.2.2	Identify the place where the surplus is generated	
R5_FR1.2.3	Record the time of publication of the surplus alert	
R5_FR1.2.4	Assess the quality of the food waste	
R5_FR1.2.4.1	Identify the type of food (cereals, roots and tubers, oil crops and pulses, fruits and vegetables, meat, fish or dairy)	
R5_FR1.2.4.2	Identify if it was cooked/uncooked	
R5_FR1.2.4.3	Identify the type of preservation that the food has had. The process comprising the most important steps from purchasing to handling leftovers (cold chain, food maintenance or cooking time, if applicable).	
R5_FR1.2.4.4	Identify the reason for its discarding (overproduction, spoilage, trim waste, sell-by date expired, best before date expired, aesthetic reasons, other)	
R5_FR1.2.4.5	Identify other relevant information (organic product)	
R5_FR1.3	Provide suggestion of all the actions that can be done with the food waste	
R5_FR1.3.1	Send the surplus alert to potential receptors	
R5_FR1.3.2	Provide information on the nearest collection point (composting or valorization)	
R5_FR1.3.3	Suggest recipes to reuse the food waste	
R5_FR1.4	To record the traceability of all the transactions	
R5_FR1.5	Analyze the food waste production to give personalized tips for improving the purchase and consumption of food	
R6_FR1	**To foster local trade, recycling and mutual learning**	



R6_FR1.1	Provide information about the way to get vouchers	I P
R6_FR1.2	Provide information about where to redeem the vouchers	I P
R6_FR1.3	Provide information about the environmental impact of product and services	I P
R6_FR1.4	Get and send information about the business that have implemented good practices	I P
R6_FR1.5	Provide information about local cooperative actions to prevent the generation of waste	I P
R6_FR1.5.1	Get the localization of the community composting sites	I P
R6_FR1.5.2	Get the localization of the collection of reusable nappies	I P
R6_FR1.5.3	Allow to report new collaborative prevention actions and good practices that are being carried on	I P
R6_FR1.5.4	Provide aggregated information about the participation in cooperative actions to R1_FR4.1	I P
R6_FR1.5.5	Provide integration with others providers of recycling products like Wallapop, Chiclfy, Vibbo, Milanuncios, etc.	I P
R7_FR1	**To foster transparency and citizen participation**	I P
R7_FR1.1	Show information about the waste management system	I P
R7_FR1.1.1	Show the public information about the state of the waste management system (R1_FR4.1)	I P
R7_FR1.1.2	Localization of the nearest collection point	I P
R7_FR1.1.3	Localization of the clean points	I P
R7_FR1.2	Allow to report incidences from mobile devices (R1_FR3)	I P
R7_FR1.3	Provide information to reduce the footprint	I P
R7_FR1.3.1	Provide information to reduce the amount of waste generated	I P
R7_FR1.3.2	Provide information about the correct way of sorting waste	I P
R7_FR1.4	Provide information about the PAYT system implemented	I P
R7_FR1.5	Provide access to the invoices	I P
R7_FR1.5.1	Review the vouchers received and redeemed so far	I P
R7_FR1.5.2	Provide a gamification experiences to improve the awareness of the citizens	I P
	Halandri Pilot	I P
R5-6-7_FR1	**Common functional requirements of the apps**	I P
R5-6-7_FR1.1	There are four profiles of users: generator, receptor, public administration, root	I P
R5-6-7_FR1.1.1	The system should be able to use the municipal authentication system	I P
R5-6-7_FR1.1.2	The system should be able to use OpenID authentication system	I P
R5-6-7_FR1.1.3	The system should be able to use the authorization system of Android and iOS	I P
R5-6-7_FR1.2	Provide aggregated information to R1_FR4.1	I P
R5-6-7_FR1.2.1	Provide aggregated information about the prevention campaigns to the monitoring system (R1_FR4.1)	I P
R5-6-7_FR1.2.2	Provide aggregated information about the use of the app to the monitoring system (R1_FR4.1)	I P
R5_FR1	**Coordinate the collection of food for social kitchens to reduce the edible food waste**	I P
R5_FR1.2	To characterize the edible food waste (for domestic generators)	I P
R5_FR1.2.1	Identify the generator	I P
R5_FR1.2.2	Identify the place where the surplus is generated	I P
R5_FR1.2.3	Record the time of publication of the surplus alert	I P
R5_FR1.2.4	Assess the quality of the food waste	I P
R5_FR1.2.4.1	Identify the type of food (cereals, roots and tubers, oil crops and pulses, fruits and vegetables, meat, fish or dairy)	I P
R5_FR1.2.4.2	Identify if it was cooked/uncooked	I P
R5_FR1.2.4.3	Identify the type of preservation that the food has had. The process comprising the most important steps from purchasing to handling leftovers (cold chain, food maintenance or cooking time, if applicable).	I P
R5_FR1.2.4.4	Identify the reason for its discarding (overproduction, spoilage, trim waste, sell-by date expired, best before date expired, aesthetic reasons, other)	I P
R5_FR1.2.4.5	Identify other relevant information (organic product)	I P
R5_FR1.3	Provide suggestion of all the actions that can be done with the food waste	I P
R5_FR1.3.1	Send the surplus alert to potential receptors	I P
R5_FR1.3.2	Provide information on the nearest collection point (composting or valorization)	I P
R5_FR1.3.3	Suggest recipes to reuse the food waste	I P
R5_FR1.4	To record the traceability of all the transactions	I P
R5_FR1.5	Analyze the food waste production to give personalized tips for improving the purchase and consumption of food	I P
R6_FR1	**To foster local trade, recycling and mutual learning**	I P
R6_FR1.3	Provide information about the environmental impact of product and services	I P
R6_FR1.4	Get and send information about the business that have implemented good practices	I P
R6_FR1.5	Provide information about local cooperative actions to prevent the generation of waste	I P
R6_FR1.5.1	Get the localization of the community composting sites	I P
R6_FR1.5.2	Get the localization of the collection of reusable nappies	I P
R6_FR1.5.3	Allow to report new collaborative prevention actions and good practices that are being carried on	I P
R6_FR1.5.4	Provide aggregated information about the participation in cooperative actions to R1_FR4.1	I P
R6_FR1.5.5	Provide integration with others providers of recycling products like Wallapop, Chiclfy, Vibbo, Milanuncios, etc.	I P
R7_FR1	**To foster transparency and citizen participation**	I P
R7_FR1.1	Show information about the waste management system	I P



R7_FR1.1.1	Show the public information about the state of the waste management system (R1_FR4.1)
R7_FR1.1.2	Localization of the nearest collection point
R7_FR1.1.3	Localization of the clean points
R7_FR1.2	Allow to report incidences from mobile devices (R1_FR3)
R7_FR1.3	Provide information to reduce the footprint
R7_FR1.3.1	Provide information to reduce the amount of waste generated
R7_FR1.3.2	Provide information about the correct way of sorting waste
R7_FR1.5	Provide access to the invoices
R7_FR1.5.2	Provide a gamification experiences to improve the awareness of the citizens

Annex 4 Level of development and implementation of the Social Actions expected per period and per pilot based on the fulfillment of every functional requirement and status at Milestone 2

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement 688995
The dissemination of results herein reflects only the author's view and the European Commission is not responsible for any use that may be made of the information it contains

		2016											2017												2018												2019											
		1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
							Use case analysis					M1								Preparatory Actions												M2		Deployment & Integration								M3		Preliminary Test				M4		Full Test				M5			
														1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42
																														ref	stat								ref	stat						ref	stat					ref	stat		

	DEVELOPMENT STATUS																																															
R17_ FR1	**To provide information and knowledge to the target groups on the social action in order to change habits and behaviours**																					a		ß																		RC						1			
R17_FR1.1	Establishment of protocols to assure that the participation is confirmed																					a		ß																		RC						1			
R17_FR1.2	Establishment of protocols to monitor the impact of the innovative awareness action																					RC		1																		1						1			
R17_FR1.2.1	Establishment of specific protocols to collect the information needed to calculate the corresponding KPIs or other own indicators																					RC		1																		1						1			
R17_FR1.2.2	Establishment of other monitoring actions to detect the impact of the action and the acquisition of knowledge or habits change (surveys)																					RC		1																		1						1			
R17_FR1.3	Establishment of subactivities based on innovative awareness methods including the IT solutions																					a		ß																		RC						1			
R17_FR1.4	To identify best practices																					RC		1																		1						1			
R17_FR2	**To monitor participation in the different actions**																					a		ß																		RC						1			
R17_FR2.1	To monitor citizens participating in social campaigns																					a		ß																		RC						1			
R17_FR3	**To prevent waste generation and to promote recycling among different sectors of the population**																					a		ß																		RC						1			
R17_FR3.1	To prevent waste generation and to promote recycling among different sectors of the population																					a		ß																		RC						1			

	IMPLEMENTATION STATUS																																															
	Seveso Pilot																																															
R17_ FR1	**To provide information and knowledge to the target groups on the social action in order to change habits and behaviours**																					T		T																		P						P			
R17_FR1.1	Establishment of protocols to assure that the participation is confirmed																					T		T																		P						P			
R17_FR1.2	Establishment of protocols to monitor the impact of the innovative awareness action																					T		T																		P						P			
R17_FR1.2.1	Establishment of specific protocols to collect the information needed to calculate the corresponding KPIs or other own indicators																					T		T																		P						P			
R17_FR1.2.2	Establishment of other monitoring actions to detect the impact of the action and the acquisition of knowledge or habits change (surveys)																					T		T																		P						P			
R17_FR1.3	Establishment of subactivities based on innovative awareness methods including the IT solutions																					P		T																		P						P			
R17_FR1.4	To identify best practices																							P																		P						P			
R17_FR2	**To monitor participation in the different actions**																							T																										
R17_FR2.1	To monitor citizens participating in social campaigns																					T		T																		P						P			
R17_FR3	**To prevent waste generation and to promote recycling among different sectors of the population**																							T																										
R17_FR3.1	To prevent waste generation and to promote recycling among different sectors of the population																					T		T																		P						P			
	Cascais Pilot																																															
R17_ FR1	**To provide information and knowledge to the target groups on the social action in order to change habits and behaviours**																							I																										
R17_FR1.1	Establishment of protocols to assure that the participation is confirmed																					I		I																		T						P			
R17_FR1.2	Establishment of protocols to monitor the impact of the innovative awareness action																					I		I																		T						P			
R17_FR1.2.1	Establishment of specific protocols to collect the information needed to calculate the corresponding KPIs or other own indicators																					I		I																		T						P			
R17_FR1.2.2	Establishment of other monitoring actions to detect the impact of the action and the acquisition of knowledge or habits change (surveys)																					I		I																		T						P			
R17_FR1.3	Establishment of subactivities based on innovative awareness methods including the IT solutions																					I		I																		T						P			
R17_FR1.4	To identify best practices																					P		P																		P						P			
R17_FR2	**To monitor participation in the different actions**																							I																										
R17_FR2.1	To monitor citizens participating in social campaigns																					I		I																		T						P			
R17_FR3	**To prevent waste generation and to promote recycling among different sectors of the population**																							I																										
R17_FR3.1	To prevent waste generation and to promote recycling among different sectors of the population																					I		I																		T						P			
	Zamudio Pilot																																															
R17_ FR1	**To provide information and knowledge to the target groups on the social action in order to change habits and behaviours**																							I																										
R17_FR1.1	Establishment of protocols to assure that the participation is confirmed																					I		I																		T						P			
R17_FR1.2	Establishment of protocols to monitor the impact of the innovative awareness action																					I		I																		T						P			
R17_FR1.2.1	Establishment of specific protocols to collect the information needed to calculate the corresponding KPIs or other own indicators																					I		I																		T						P			
R17_FR1.2.2	Establishment of other monitoring actions to detect the impact of the action and the acquisition of knowledge or habits change (surveys)																					I		I																		T						P			
R17_FR1.3	Establishment of subactivities based on innovative awareness methods including the IT solutions																					I		I																		T						P			
R17_FR1.4	To identify best practices																					P		P																		P						P			
R17_FR2	**To monitor participation in the different actions**																							I																										
R17_FR2.1	To monitor citizens participating in social campaigns																					I		I																		T						P			
R17_FR3	**To prevent waste generation and to promote recycling among different sectors of the population**																							I																										
R17_FR3.1	To prevent waste generation and to promote recycling among different sectors of the population																					I		I																		T						P			
	Halandri Pilot																																															
R17_ FR1	**To provide information and knowledge to the target groups on the social action in order to change habits and behaviours**																					I		I																		T						P			
R17_FR1.1	Establishment of protocols to assure that the participation is confirmed																					I		I																		T						P			
R17_FR1.2	Establishment of protocols to monitor the impact of the innovative awareness action																					I		I																		T						P			
R17_FR1.2.1	Establishment of specific protocols to collect the information needed to calculate the corresponding KPIs or other own indicators																					I		I																		T						P			
R17_FR1.2.2	Establishment of other monitoring actions to detect the impact of the action and the acquisition of knowledge or habits change (surveys)																					I		I																		T						P			
R17_FR1.3	Establishment of subactivities based on innovative awareness methods including the IT solutions																					I		I																		T						P			
R17_FR1.4	To identify best practices																					P		P																		P						P			
R17_FR2	**To monitor participation in the different actions**																							I																										
R17_FR2.1	To monitor citizens participating in social campaigns																					I		I																		T						P			
R17_FR3	**To prevent waste generation and to promote recycling among different sectors of the population**																							I																										
R17_FR3.1	To prevent waste generation and to promote recycling among different sectors of the population																					I		I																		T						P			

DEPLOYMENT

I	Sensors are being integrated with the rest of solutions at the pilot site.
T	Sensors have been deployed and have been integrated. Tests are being carried out in real conditions.
P	Sensors have been deployed and work as expected.

Development

Ø	The device has been designed but it was not started its assembly
α	Not all functionalities are implemented or some of them are in a "Wizard of Oz" type of implementation (the function exists but behaves trivially). Only partial test could be made.
ß	All functionalities are implemented but some of them do not behave as expected. Obvious bugs are been found. The system is been tested in lab conditions.
RC	All functionalities are implemented and behaves as expected. Obvious bugs have been ironed out. The system is been tested in real conditions.
1	All functionalities are working as expected. The system have been tested in real conditions.

Annex 5 Level of development and implementation of the Educational Materials expected per period and per pilot based on the fulfillment of every functional requirement and status at Milestone 2

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		2016											2017												2018												2019											
		1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
		Use case analysis					M1	Preparatory Actions														M2	Deployment & Integration									M3	Preliminary Test				M4	Full Test					M5				
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42				
	DEVELOPMENT STATUS																					ref	stat								ref	stat											ref	stat				
R-ICT-SOCIAL_FR1	**To teach on waste management and prevention actions**																																														
R-ICT-SOCIAL_FR1.1	To teach on waste management and prevention actions																					a	α								ß					1							1				
R-ICT-SOCIAL_FR2	**Track players and results**																																														
R-ICT-SOCIAL_FR2.1	Provide a complete log of the use of the tool																					a	Ø								RC					1							1				
R-ICT-SOCIAL_FR2.1.1	Track authorship of every solution																					a	Ø								RC					1							1				
R-ICT-SOCIAL_FR2.1.2	Register the selected KPIs for the evaluation of the solutions achieved																					a	Ø								RC					1							1				
R-ICT-SOCIAL_FR2.1.3	Track the different created solutions to be later assessed or implemented																					a	Ø								RC					1							1				
R-ICT-SOCIAL_FR2.2	Register the needed info to calculate the related KPIs																					a	Ø								RC					1							1				
R-ICT-SOCIAL_FR2.3	Provide final information about the impact of the mistakes of separation at source																					a	α								ß					RC							1				
R-ICT-SOCIAL_FR2.3.1	product																					a	α								ß					RC							1				
R-ICT-SOCIAL_FR2.3.2	Provide information about the impact and results of the solutions																					a	Ø								ß					RC							1				
R-ICT-SOCIAL_FR2.4	Detect where the users have had more difficulties																					a	Ø								RC					1							1				
R-ICT-SOCIAL_FR2.4.1	Coordinated with the performance of learning analytics																					a	Ø								RC					1							1				
R-ICT-SOCIAL_FR2.4.2	Detect the repeated mistakes and doubts of the users about the correct separation																					a	Ø								RC					1							1				
R8_FR1	**To teach students in waste management and improving the center management system**																					a									ß					RC							1				
R8_FR1.1	To teach students in waste management and improving the center management system																					a	ß								ß					RC							1				
R8_FR1.2	Monitor the effect/impact on the students and the learned concepts/abilities, instruction for teachers evaluation																					a	Ø								ß					RC							1				
R8_FR1.3	Propose activities/ideas that later can be implemented and monitored in the center to improve the waste management																					a	α								ß					RC							1				
R8_FR1.4	Develop mobile games to improve waste management and to promote healthy lifestyle habits																					a	Ø								ß					RC							1				
R9_FR1	**To teach in the separation at source and related impacts**																					a	ß								ß					RC							1				
R9_FR1.1	To teach in the separation at source and related impacts																					a	ß								ß					RC							1				
R10_FR1	**To teach in eco-design**																					a	α								ß					RC							1				
R10_FR1.1	To teach in eco-design																					a	α								ß					RC							1				
R10_FR1.2	Include a selection of key products to be analysed																					a	α								ß					RC							1				
R11_FR1	**To train collection managers and other technicians to optimize the system**																					a	Ø								ß					RC							1				
R11_FR1.1	To train collection managers and other technicians to optimize the system																					a	Ø								ß					RC							1				
R11_FR1.2	Offer different solutions to optimize the system: technical, social, economic, etc.																					a	Ø								ß					RC							1				
R12_FR1	**Teach about circular economy principles**																					a	Ø								ß					RC							1				
R12_FR1.1	Teach about circular economy principles																					a	Ø								ß					RC							1				
R12_FR1.2	Provide info about the raw materials obtained to be reintroduced in the production chain of other products																					a	Ø								ß					RC							1				
R12_FR1.3	Provide info about the specific prevention actions developed for each pilot																					a	Ø								ß					RC							1				
R13-14-15_FR1	**Facilitate the co-creation of solutions**																					Ø	Ø								a					ß							1				
R13-14-15_FR1.1	Provide a stage editor																					Ø	Ø								a					ß							1				

	IMPLEMENTATION STATUS																																														
	Seveso Pilot																																															
R-ICT-SOCIAL_FR1	**To teach on waste management and prevention actions**																																														
R-ICT-SOCIAL_FR1.1	To teach on waste management and prevention actions																																			P							P				
R-ICT-SOCIAL_FR2	**Track players and results**																																														
R-ICT-SOCIAL_FR2.1	Provide a complete log of the use of the tool																																			P							P				
R-ICT-SOCIAL_FR2.1.1	Track authorship of every solution																																			P							P				
R-ICT-SOCIAL_FR2.1.2	Register the selected KPIs for the evaluation of the solutions achieved																																			P							P				
R-ICT-SOCIAL_FR2.1.3	Track the different created solutions to be later assessed or implemented																																			P							P				
R-ICT-SOCIAL_FR2.2	Register the needed info to calculate the related KPIs																																			P							P				
R-ICT-SOCIAL_FR2.3	Provide final information about the impact of the mistakes of separation at source																																			T							P				
R-ICT-SOCIAL_FR2.3.1	Provide information about the impact and recyclability of the materials to create a product																																			T							P				
R-ICT-SOCIAL_FR2.3.2	Provide information about the impact and results of the solutions																																			T							P				
R-ICT-SOCIAL_FR2.4	Detect where the users have had more difficulties																																			T							P				
R-ICT-SOCIAL_FR2.4.1	Coordinated with the performance of learning analytics																																			T							P				
R-ICT-SOCIAL_FR2.4.2	Detect the repeated mistakes and doubts of the users about the correct separation																																			T							P				
R9_FR1	**To teach in the separation at source and related impacts**																																														
R9_FR1.1	To teach in the separation at source and related impacts																																			I							T				P
R10_FR1	**To teach in eco-design**																																														
R10_FR1.1	To teach in eco-design																																														
R10_FR1.2	Include a selection of key products to be analysed																																														
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R11_FR1.1	To train collection managers and other technicians to optimize the system																																			I							T				P
R11_FR1.2	Offer different solutions to optimize the system: technical, social, economic, etc.																																			I							T				P
R12_FR1	**Teach about circular economy principles**																																														
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R12_FR1.2	Provide info about the raw materials obtained to be reintroduced in the production chain of other products																																			I							T				P
R12_FR1.3	Provide info about the specific prevention actions developed for each pilot																																			I							T				P
R13-14-15_FR1	**Facilitate the co-creation of solutions**																																														
R13-14-15_FR1.1	Provide a stage editor																																			I							T				P
	Cascais Pilot																																														
R-ICT-SOCIAL_FR1	**To teach on waste management and prevention actions**																																														
R-ICT-SOCIAL_FR1.1	To teach on waste management and prevention actions																																			P							P				
R-ICT-SOCIAL_FR2	**Track players and results**																																														
R-ICT-SOCIAL_FR2.1	Provide a complete log of the use of the tool																																			T							P				P
R-ICT-SOCIAL_FR2.1.1	Track authorship of every solution																																			T							P				P

DEPLOYMENT

I	Sensors are being integrated with the rest of solutions at the pilot site.
T	conditions.
P	Sensors have been deployed and work as expected.

Development

Ø	The device has been designed but it was not started its assembly
α	Not all functionalities are implemented or some of them are in a "Wizard of Oz" type of implementation (the functionality but behave trivially. Only several test could be All functionalities are implemented but some of them do not behave as expected. Obvious bugs are been found. The system is been tested in lab conditions
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		2016											2017												2018												2019											
		1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
							Use case analysis					M1		Preparatory Actions										M2		Deployment & Integration							M3		Preliminary Test			M4		Full Test					M5			
							1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42
																									ref	stat							ref	stat					ref	stat							ref	stat		
R-ICT-SOCIAL_FR2.1.2	Register the selected KPIs for the evaluation of the solutions achieved																																T						P								P		
R-ICT-SOCIAL_FR2.1.3	Track the different created solutions to be later assessed or implemented																																T						P								P		
R-ICT-SOCIAL_FR2.2	Register the needed info to calculate the related KPIs																																T						P								P		
R-ICT-SOCIAL_FR2.3	Provide final information about the impact of the mistakes of separation at source																																T						T								P		
R-ICT-SOCIAL_FR2.3.1	Provide information about the impact and recyclability of the materials to create a product																																T						T								P		
R-ICT-SOCIAL_FR2.3.2	Provide information about the impact and results of the solutions																																T						T								P		
R-ICT-SOCIAL_FR2.4	Detect where the users have had more difficulties																																T						P								P		
R-ICT-SOCIAL_FR2.4.1	Coordinated with the performance of learning analytics																																T						P								P		
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R11_FR1.2	Offer different solutions to optimize the system: technical, social, economic, etc.																																I						T								P		
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R12_FR1.1	Teach about circular economy principles																																I						T								P		
R12_FR1.2	Provide info about the raw materials obtained to be reintroduced in the production chain of other products																																I						T								P		
R12_FR1.3	Provide info about the specific prevention actions developed for each pilot																																I						T								P		
R13-14-15_FR1	**Facilitate the co-creation of solutions**																																I						T								P		
R13-14-15_FR1.1	Provide a stage editor																																I						T								P		
	Zamudio Pilot																																															
R-ICT-SOCIAL_FR1	**To teach on waste management and prevention actions**																																															
R-ICT-SOCIAL_FR1.1	To teach on waste management and prevention actions																							I									T						P								P		
R-ICT-SOCIAL_FR2	**Track players and results**																																															
R-ICT-SOCIAL_FR2.1	Provide a complete log of the use of the tool																																T						P								P		
R-ICT-SOCIAL_FR2.1.1	Track authorship of every solution																																T						P								P		
R-ICT-SOCIAL_FR2.1.2	Register the selected KPIs for the evaluation of the solutions achieved																																T						P								P		
R-ICT-SOCIAL_FR2.1.3	Track the different created solutions to be later assessed or implemented																																T						P								P		
R-ICT-SOCIAL_FR2.2	Register the needed info to calculate the related KPIs																																T						P								P		
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R8_FR1.2	Monitor the effect/impact on the students and the learned concepts/abilities, instruction for teachers evaluation																							I									T						T								P		
R8_FR1.3	Propose activities/ideas that later can be implemented and monitored in the center to improve the waste management																							I									T						T								P		
R8_FR1.4	Develop mobile games to improve waste management and to promote healthy lifestyle habits																							I									T						T								P		
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R12_FR1.3	Provide info about the specific prevention actions developed for each pilot	
R13-14-15_FR1	**Facilitate the co-creation of solutions**	
R13-14-15_FR1.1	Provide a stage editor	

Annex 6 Level of development and implementation of the New Treatment Plants expected per period and per pilot based on the fulfillment of every functional requirement and status at Milestone 2

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		2016												2017												2018												2019											
		1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
						Use case analysis					M1			Preparatory Actions												M2	Deployment & Integration								M3	Pretiminary Test				M4	Full Test					M5			
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42						
	DEVELOPMENT STATUS																																															
R19_FR1	**Monitoring treatment plants (biowaste)**																			ref a	stat RC								ref ß	stat								ref RC	stat								ref 1	stat		
R19_FR1.1	Recording the temperature of the Biowaste Treatment Unit (BTU)																			a	RC								ß									RC									1			
R19_FR1.2	Recording the moisture of the Biowaste Treatment Unit (BTU)																			a	RC								ß									RC									1			
R19_FR1.3	Monitoring of the treatment duration of Biowaste Treatment Unit (BTU)																			a	RC								ß									RC									1			
R19_FR2	**Biomass product valorization**																			a	α								ß									RC									1			
R19_FR2.1	Quantity of biomass product loaded to bioreactor at NTUA (kg/day)																			a	α								ß									RC									1			
R19_FR2.2	Monitoring the quantity of biofuel produced (m3 /day)																			a	α								ß									RC									1			
R19_FR2.3	Monitoring the cost per collection route when collection truck runs with CNG (biofuel) (€/route)																			a	Ø								ß									RC									1			
R19_FR2.4	Monitoring the quantity and (possibly quality) of the outputs																			a	ß								ß									RC									1			
R19_FR2.4.1	Monitoring the quantity and (possibly quality) of HYTHANE produced per kg biomass product																			a	Ø								ß									RC									1			
R19_FR2.4.2	Monitoring the quantity and (possibly quality) of METHANE produced per kg biomass product																			a	ß								ß									RC									1			
R19_FR2.4.3	Monitoring the quantity and (possibly quality) of ETHANOL produced per kg biomass product																			a	α								ß									RC									1			
R19_FR2.4.4	Monitoring the quantity and (possibly quality) of COMPOST produced per kg biomass product																			a	ß								ß									RC									1			
R19_FR2.4.5	Monitoring the quantity and (possibly quality) of PELLETS produced per kg biomass product																			a	ß								ß									RC									1			
R19_FR2.4.6	Monitoring the quantity and (possibly quality) of ALTERNATIVE FUEL FOR CEMENT INDUSTRY produced per kg biomass product																			a	ß								ß									RC									1			
R19_FR2.4.7	Monitoring the quantity and (possibly quality) of BIOSORBENT produced per kg biomass product																			a	ß								ß									RC									1			
R19_FR2.4.8	Monitoring the quantity and (possibly quality) of ELECTRICITY produced per kg biomass product through MFC technology																			a	ß								ß									RC									1			
R19_FR2.4.9	Monitoring the quantity and (possibly quality) of ANIMAL FEED produced per kg biomass product																			a	α								ß									RC									1			
R20_FR1	**To treat the food waste and nappies**																			a									ß									RC									1			
R20_FR1.1	Allow you to temporarily store the disposable nappies, kitchen waste and/or expired food product (EFP)s																			a	α								ß									RC									1			
R20_FR1.2	Allow you to co-treat disposable nappies, EFP and /or kitchen waste in the Waste Treatment Unit (WTU)																			a	α								ß									RC									1			
R20_FR1.3	Allow you to compost the WTU sludge																			a	Ø								ß									RC									1			
R20_FR2	**Monitoring treatment plants (nappies and biowaste)**																			a									ß									RC									1			
R20_FR2.1	Monitor and control the temperature of the Waste Treatment Unit (WTU)																			a	ß								ß									RC									1			
R20_FR2.2	Monitor and control the pressure of the Waste Treatment Unit (WTU)																			a	ß								ß									RC									1			
R20_FR2.3	Monitor the volume and composition of produced biogas in the WTU per kg of nappies and EFP fed in the system																			a	ß								ß									RC									1			
R20_FR2.4	Monitor the amount and quality of compost produced per kg of nappies and EFP treated in the WTU																			a	Ø								ß									RC									1			

	IMPLEMENTATION STATUS Seveso Pilot Cascais Pilot Zamudio Pilot																																															
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DEPLOYMENT

I	Sensors are being integrated with the rest of solutions at the pilot site.
T	Sensors have been deployed and have been integrated. Tests are being carried out in real conditions.
P	Sensors have been deployed and work as expected.

Development

Ø	The device has been designed but it was not started its assembly
α	Not all functionalities are implemented or some of them are in a "Wizard of Oz" type of implementation (the function exists but behaves trivially). Only partial test could be made.
ß	All functionalities are implemented but some of them do not behave as expected. Obvious bugs are been found. The system is been tested in lab conditions.
RC	All functionalities are implemented and behaves as expected. Obvious bugs have been ironed out. The system is been tested in real conditions.
1	All functionalities are working as expected. The system have been tested in real conditions.

Annex 7 Social Actions Gantt Chart

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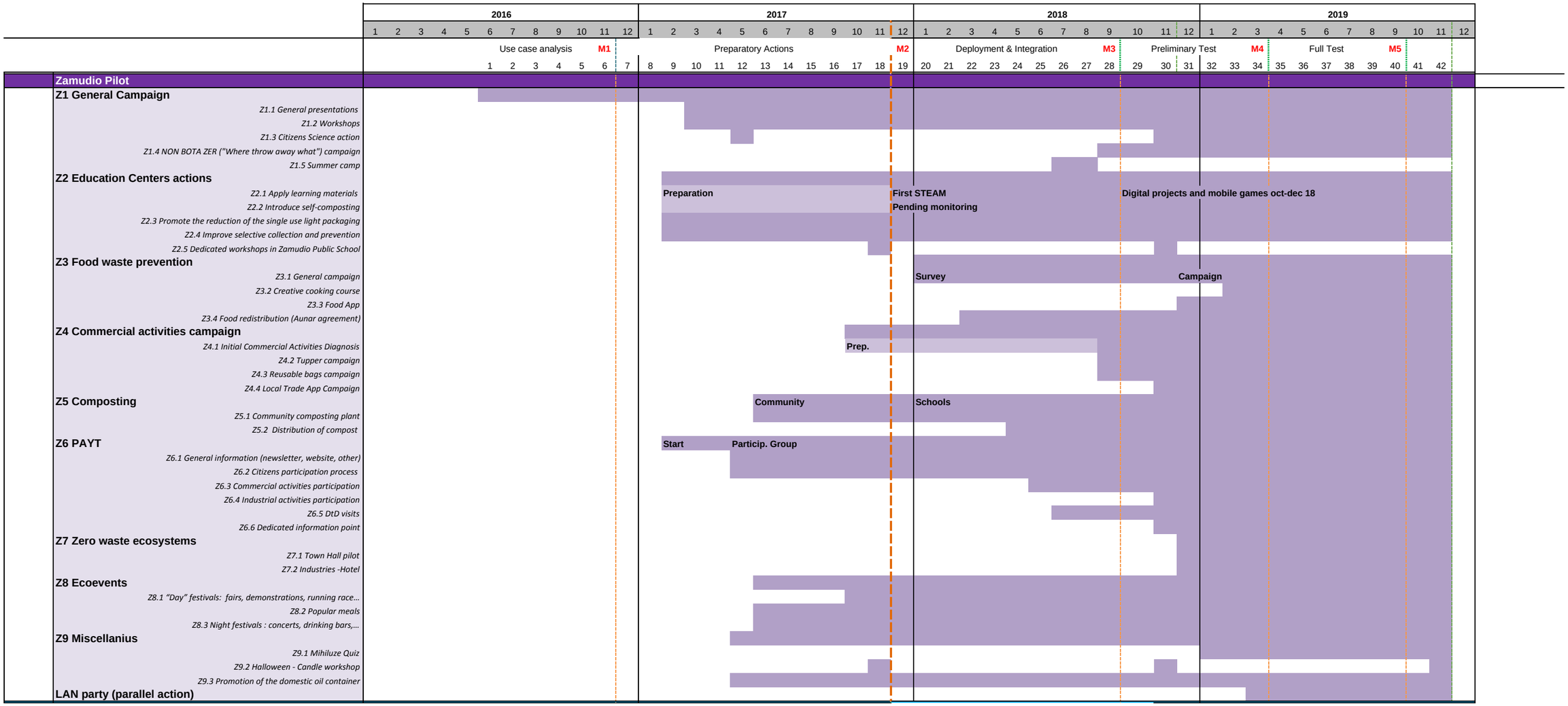


Modifications:

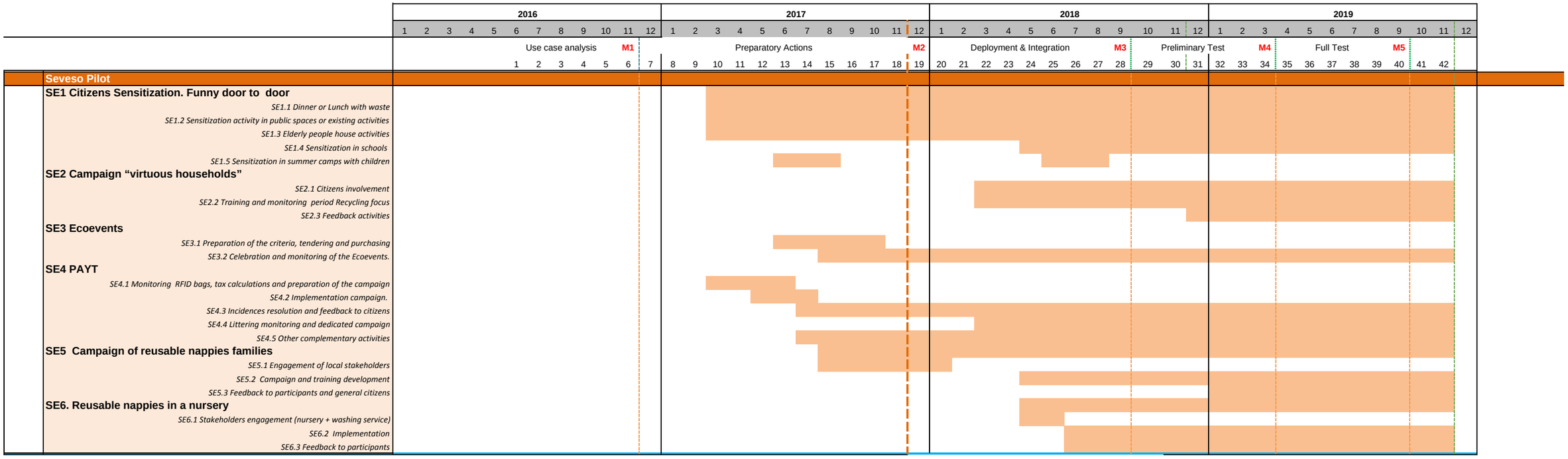
Z2: Some actions implemented (composting modules, workshop for reuse of cooking oil), delay in the application of the STEAM lessons

Z3: Preparatory activities (survey) Dec '17

Z4: Preparatory activities during the last months of the year, initial activities Feb'18

Z6.4 Industrial activities participation will be delayed 4-6 months

Forecast for the development of the action



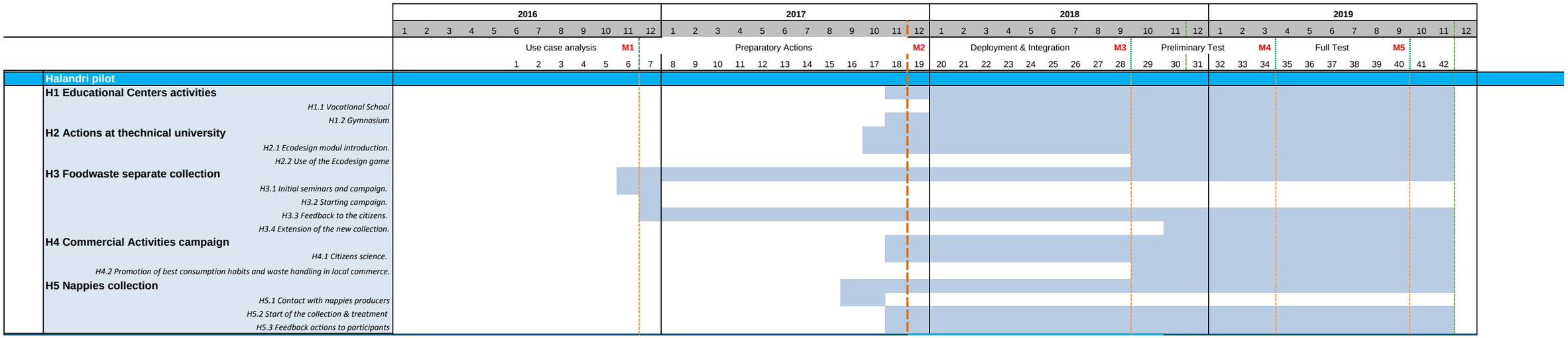
Modifications:

SE2: Delayed until March-April 2018

SE5: Preparatory activities in Sep ’17, main activities will start in January ‘18

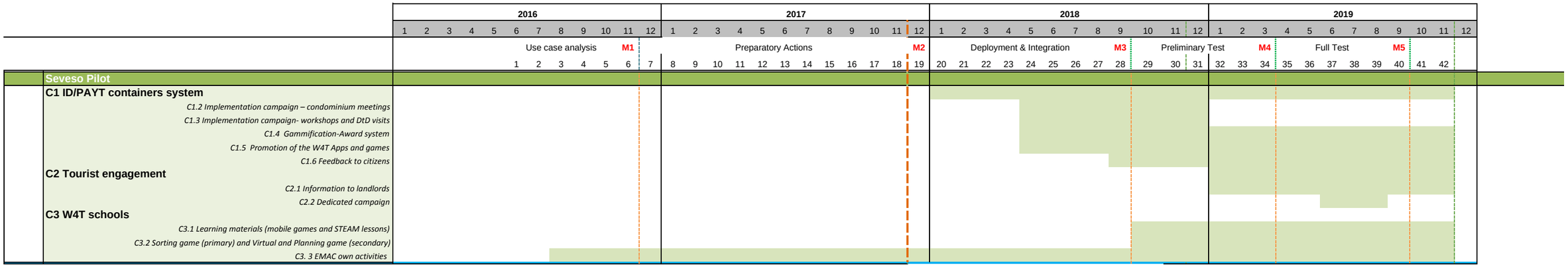
SE6: Delayed until June 18

Forecast for the development of the action



H3. New action added, extension of the biowaste collection

Forecast for the development of the action


2016
2017
2018
2019
1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12
Use case analysis
M1
Preparatory Actions
M2
Deployment & Integration
M3
Preliminary Test
M4
Full Test
M5
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42
Seveso Pilot
C1 ID/PAYT containers system
C1.2 Implementation campaign – condominium meetings
C1.3 Implementation campaign- workshops and DtD visits
C1.4 Gammification-Award system
C1.5 Promotion of the W4T Apps and games
C1.6 Feedback to citizens
C2 Tourist engagement
C2.1 Information to landlords
C2.2 Dedicated campaign
C3 W4T schools
C3.1 Learning materials (mobile games and STEAM lessons)
C3.2 Sorting game (primary) and Virtual and Planning game (secondary)
C3. 3 EMAC own activities
Forecast for the development of the action

Annex 8 Social Actions Data Model

This section provides a description of Social Actions data model in terms of entities and corresponding attributes along an UML model to clarify the relation between them.

- Strategy: Global concept covering several actions that are carried out to achieve one or more goals. Strategy generally involves determining the target group, the area served, objectives and actions to achieve them.
    - id: Entity's unique identifier.
    - type: It must be `Strategy`.
    - name: Strategy's name which should be meaningful in the context of a project or organization.
    - description: Strategy's description
    - areaServed: Location of the area to which the strategy is applied. For the Waste4Think project the possible choices for this field are:
        - 'CASCAIS'
        - 'HALANDRI'
        - 'SEVESO''
        - 'ZAMUDIO'
    - objectives: Enumeration of the objectives of the strategy
    - promoter: Person or organization responsible for organizing the strategy
    - executor: Person or organization responsible for carrying out the actions within the strategy
    - keyMessages: Main messages that want to be delivered with the implementation of this strategy.
    - monitoringStrategy: Description of the strategy being used to monitor the progress of the related social actions and implementations (surveys, waste weighting).
    - resultsFeedback: communication actions to come back to the target group with the results of the deployment of the strategy.

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- Action: Description of the general characteristics preparing an event like this with information such as the lessons learnt, the monitoring methodology, etc.
    - id: Entity's unique identifier.
    - type: It must be `Action`.
    - name: Action's name which should be meaningful in the context of a project or organization.
    - refStrategy: Strategy it belongs to.
    - refPrecendets: List of other Actions that are precedents to this.
    - Status: situation of the Action during a particular time. Possible values are:
        - 'not started
        - 'ongoing'
        - 'finished'
    - description: Description of the action.
    - areaServed: Location of the area to which the Social action is applied. It can be used to define the area where the strategy is applied, etc.
    - areaDescription: For organizational purposes, it allows to add extra textual geographical information such as district, borough or any other hint which can help to identify the Social Action coverage.
    - successKeyPoints: Text describing the
    - lessonsLearnt: Text about the lessons learned with the action.
    - refWasteStreams: Streams at which this action applies. Expected values are:
    - stages: Stage at which this action applies. Expected values :
    - monitoringMethodology: Description of the monitoring methodology description : surveys, waste weighting, etc.
    - communicationTools: Text describing the communication tools.
    - trainingTools. Text describing the training tools.
    - otherTools: Text describing other engagement tools that may be interesting to underline.
    - environmentalimpact: Text describing the environmental impact.
    - socialImpact: Text describing the social impact.

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- economicalImpact: Text describing the economic impact.
- otherImpact: Text describing other impacts that may be interesting to underline.
- cost: total cost of the action once implemented.
- otherInformation: Text to describe other information about the action that may be interesting to outline
- isBestPractice: Boolean value indicating whether this a Best Practice or not.
- refKpis: Reference to the list of KPIs to be monitored during this social action.

- Implementation: Specific implementation of an Action.
  - id: Entity's unique identifier.
  - type: It must be `Action`.
  - name: Social action's name which should be meaningful in the context of a project or organization.
  - refAction: Action it belongs to.
  - success: 0 to 5 number describing the success of the action once implemented.
  - description: Specific description of this social action implementation.
  - areaServed: Location of the social action implementation.
  - startDate: Date when the social action starts.
  - endDate: Date when the social action ends.
  - refTargeGroups: Text describing the entities that are target of this strategy. For each target group, the amount of expected and real stakeholders can be specified.
  - participationRate: Amount of people that participated in the social action implementation.
  - cost: Cost of this social action implementation.
  - mediaUrls: List of URLs to media resources (photos, press, etc.).
  - otherInformation: Text with other information that may be interesting to underline.
  - otherQualitativeResults: Text describing other qualitative results that may be interesting to outline.
  - refKpis: Reference to the list of KPIs to be monitored during this social action implementation.

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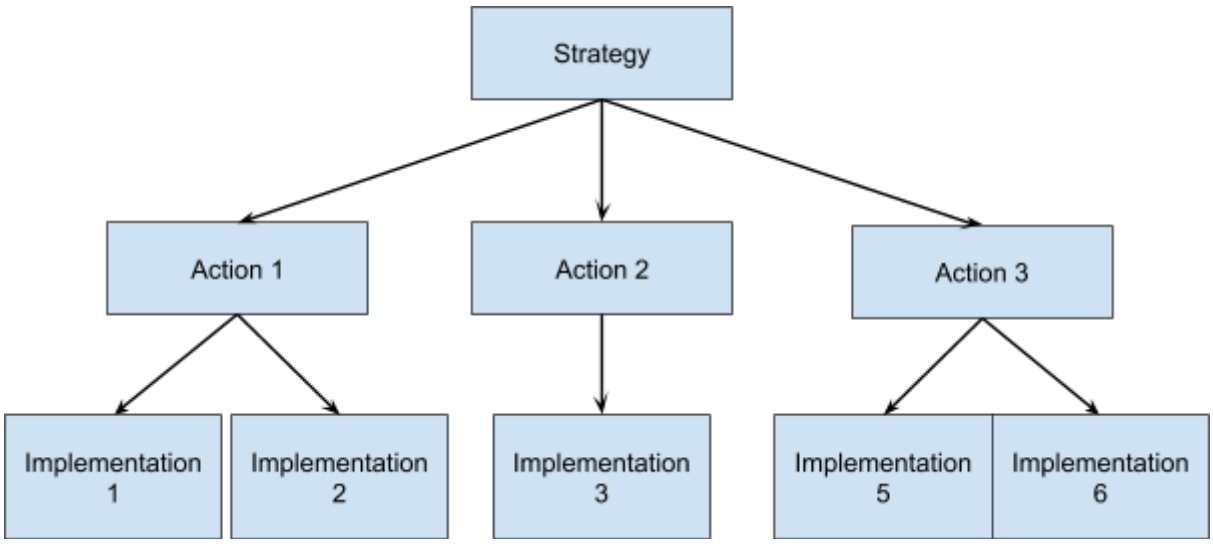
- keywords: List of keywords for this social action implementation.

UML



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Annex 9 Cartography for Halandri

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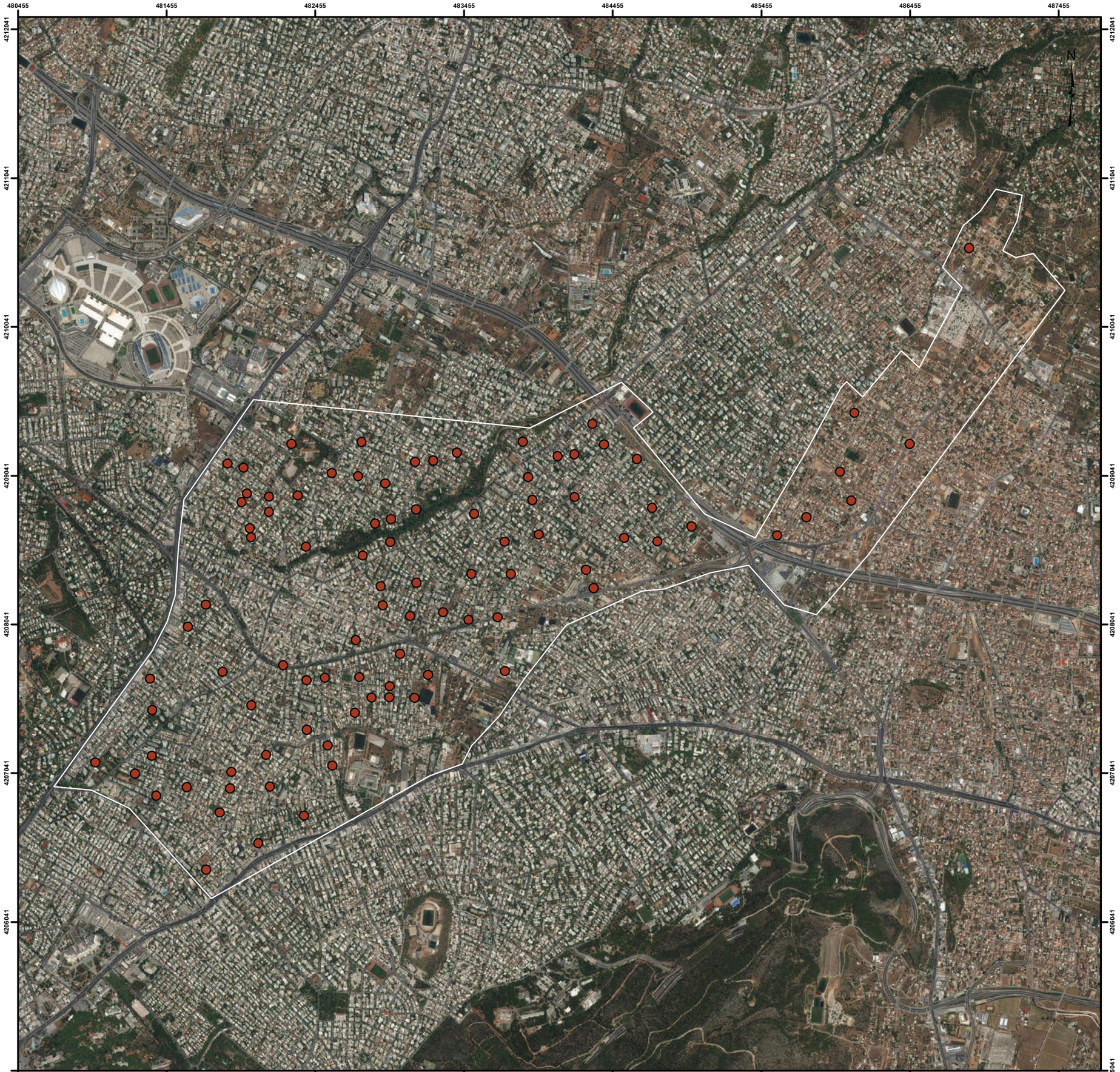


LEGEND:

Collection system: 3C

Separate collection:

Biowaste

For Biowaste pilot: 2146 inhabitants
264 deposit point

Provision of deposit point to users (ratio):

Biowaste: 8 inhabitants/deposit point

PROJECT:

WASTE4THINK: Moving towards life cycle thinking
by integrating advanced waste management systems
GA number: 688995

TITLE:

Location of biowaste deposit points in Halandri

REFERENCE: **CODE ID:** CD.6, WCD1, WCD2

WP1. Pilots planning and execution
D1.4 Preparatory Actions Report
KPIs context diagram of waste management
Context Data

DATE: November 2017 **MAPS INDEX:** 1

m
0 125 250 500 750 1.000 1:25.000

GGRS87_Greek_Grid
Transverse_Mercator

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement 688995

LEGEND:

Biowaste route

Stops

Fractions: Biowaste

Frecuency: Monday, Thursday
Tuesday, Friday

PROJECT:

WASTE4THINK: Moving towards life cycle thinking
by integrating advanced waste management systems
GA number: 688995

TITLE:

Biowaste collection route in Halandri

REFERENCE: **CODE ID:** T4.4

WP1. Pilots planning and execution
D1.4 Preparatory Actions Report
KPIs context diagram of waste management
Collection

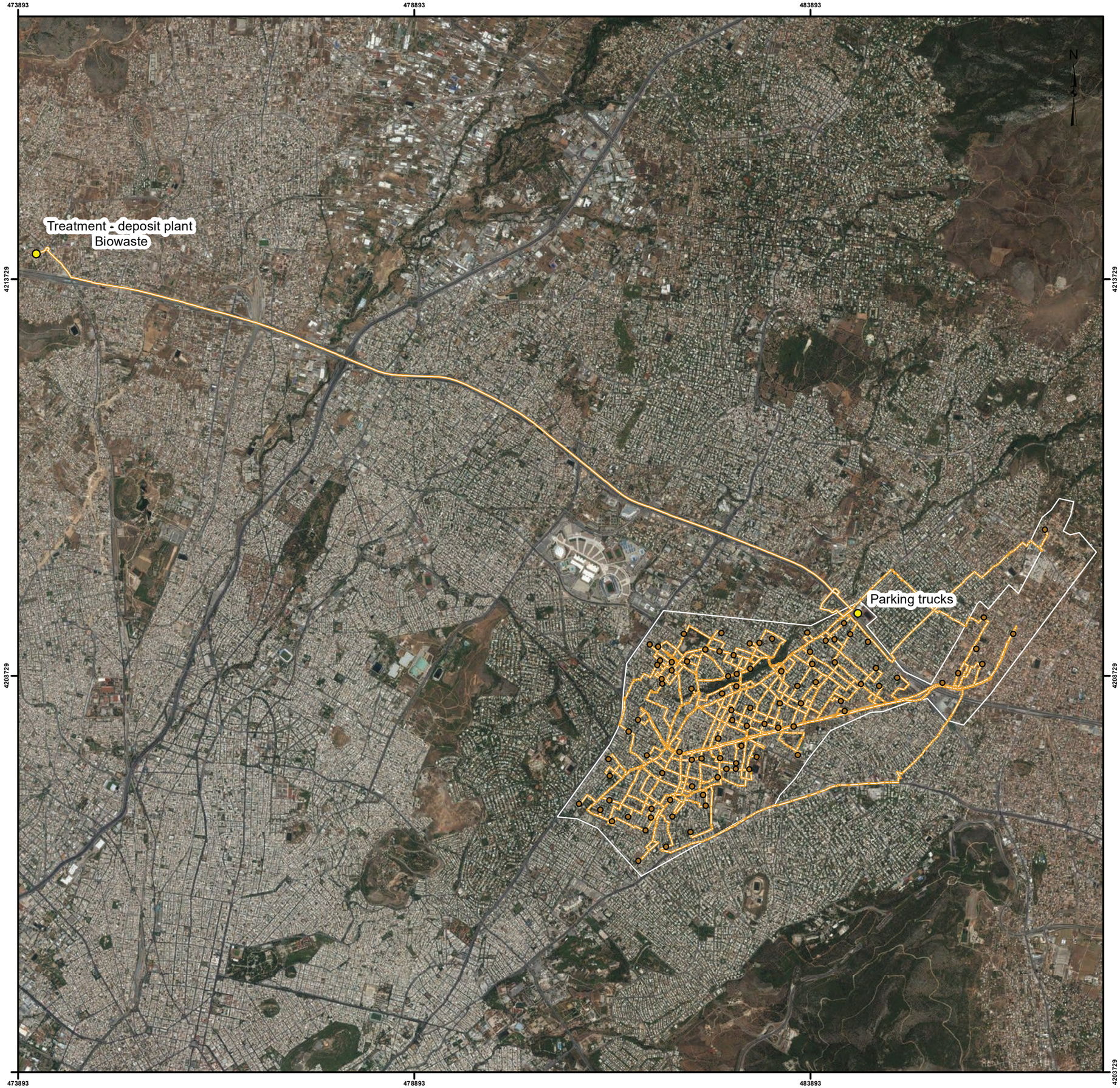
DATE: November 2017 **MAPS INDEX:** 2

0 125 250 500 750 1.000 m

1:25.000

GGRS87_Greek_Grid
Transverse_Mercator

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement 688995



LEGEND:

Biowaste route

Km travelled: 251 Km

PROJECT:

WASTE4THINK: Moving towards life cycle thinking
by integrating advanced waste management systems
GA number: 688995

TITLE:

Total collection route in Halandri

REFERENCE: **CODE ID:** T4.4, CD7, CD8

WP1. Pilots planning and execution
D1.4 Preparatory Actions Report
KPIs context diagram of waste management
Collection

DATE: November 2017 **MAPS INDEX:** 3

m
0 250 500 1.000 1.500 2.000
1:47.000

GGRS87_Greek_Grid
Transverse_Mercator

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LEGEND:

Biowaste route

Stops

Fractions: Biowaste

Frecuency: Monday, Thursday
Tuesday, Friday

PROJECT:

WASTE4THINK: Moving towards life cycle thinking
by integrating advanced waste management systems
GA number: 688995

TITLE:

Biowaste collection route in Halandri

REFERENCE: **CODE ID:** T4.4

WP1. Pilots planning and execution
D1.4 Preparatory Actions Report
KPIs context diagram of waste management
Collection

DATE: November 2017 **MAPS INDEX:** 2

0 125 250 500 750 1.000 m

1:25.000

GGRS87_Greek_Grid
Transverse_Mercator

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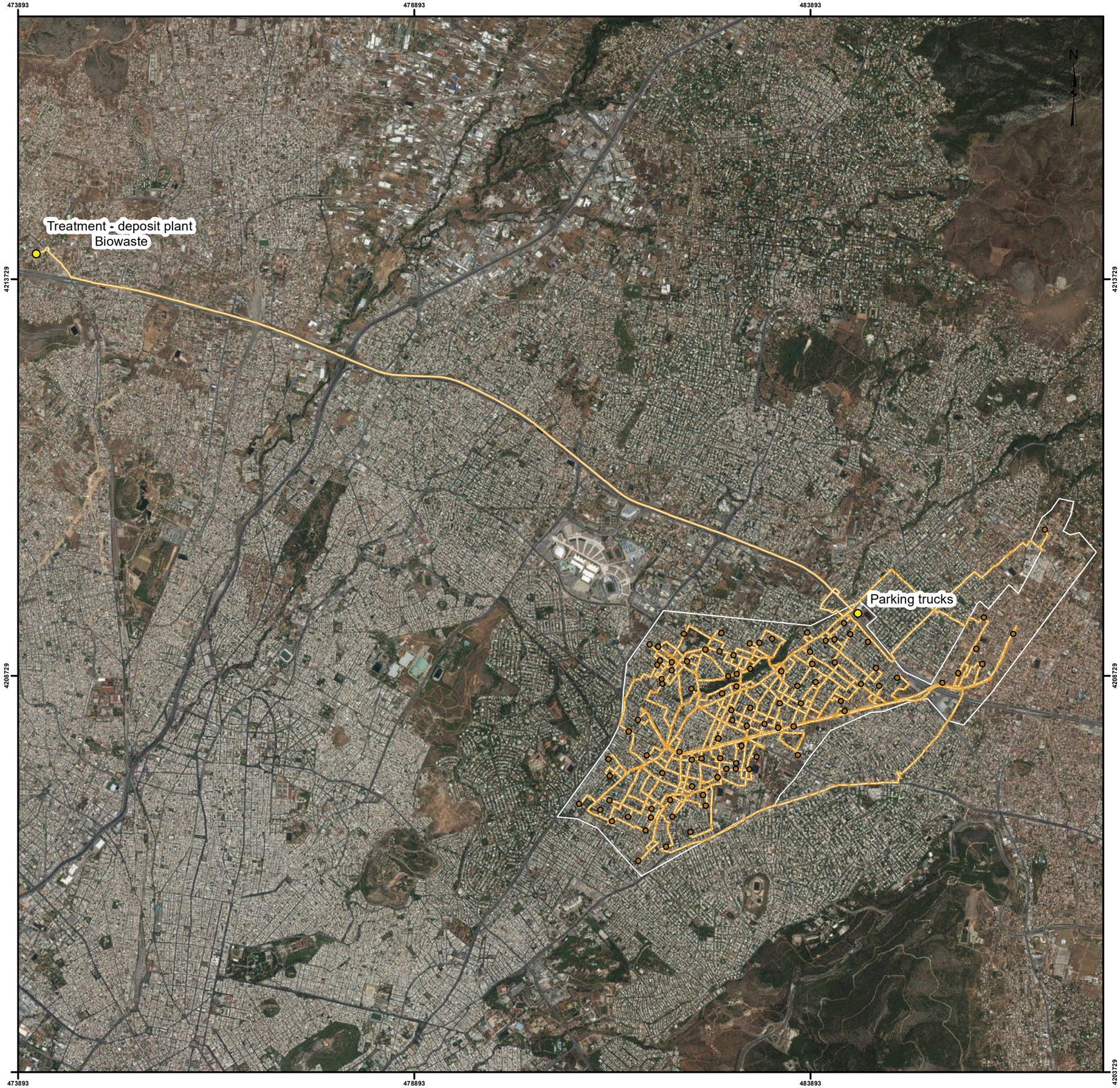

LEGEND:

Biowaste route

Km travelled: 251 Km

PROJECT:

WASTE4THINK: Moving towards life cycle thinking
by integrating advanced waste management systems
GA number: 688995

TITLE:

Total collection route in Halandri

REFERENCE: **CODE ID:** T4.4, CD7, CD8

WP1. Pilots planning and execution
D1.4 Preparatory Actions Report
KPIs context diagram of waste management
Collection

DATE: November 2017 **MAPS INDEX:** 3

m
0 250 500 1.000 1.500 2.000
1:47.000

GGRS87_Greek_Grid
Transverse_Mercator

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Annex 10 Seveso Surveys

Survey 1 applied until end of June 2017 and it has been used for calculating the people changing habits because of PAYT

Questionario sui comportamenti dei cittadini nella gestione dei rifiuti

Il questionario è anonimo e i dati raccolti saranno utilizzati ai fini statistici nell'ambito del Progetto Europeo Waste4Think di cui il Comune di Seveso è partner.

La tua opinione può anche essere utile al Comune per migliorare alcuni elementi nella gestione comunale dei rifiuti.

Data.....

Evento.....

1. Metti in atto comportamenti per la prevenzione dei rifiuti?

- Si
- No

1.1. Se si, quali?

- Acquisto prodotti sfusi per ridurre il packaging (detersivi, pasta, etc.) o scelgo prodotti con poco o nessun imballaggio
- Acquisto prodotti "concentrati", "formato famiglia" o "ricaricabili" in modo da ridurre gli imballaggi
- Partecipo ad un "gruppo di acquisto sostenibile"
- Uso l'acqua del rubinetto o mi rifornisco presso le Case dell'Acqua comunali per evitare di comprare acqua in bottigli
- Faccio un uso dei prodotti responsabile in modo da prolungare la loro vita utile (es. Attenta conservazione, controllo delle date di scadenza, riparo, riuso, etc.)
- Evito l'uso domestico e frequente di prodotti usa e getta (es. tovaglioli di carta, piatti, bicchieri e posate di plastica, etc.)
- Uso i pannolini lavabili per i miei bambini anziché quelli usa e getta
- Riduco l'uso di carta, preferendo i mezzi informatici, con fotocopie fronte/retro, usando i fogli da entrambi i lati
- Preferisco, quando possibile, ricevere comunicazioni e bollette on-line invece che in formato cartaceo
- Altro_____

2. Hai cambiato il tuo comportamento sulla prevenzione dei rifiuti dopo l'introduzione della tariffa puntuale?

- Si
- No

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2.1. Come valuti il tuo comportamento sulla prevenzione dei rifiuti prima dell'introduzione della tariffa puntuale? (punteggio: 1 per niente attento, 5 molto attento)

1 2 3 4 5

2.2. Come valuti il tuo comportamento sulla prevenzione dei rifiuti dopo l'introduzione della tariffa puntuale? (punteggio: 1 per niente attento, 5 molto attento)

1 2 3 4 5

3. Hai cambiato il tuo comportamento sulla raccolta differenziata dopo l'introduzione della tariffa puntuale?

- Si
- No

3.1. Come valuti il tuo comportamento sulla raccolta differenziata prima dell'introduzione della tariffa puntuale? (punteggio: 1 per niente attento, 5 molto attento)

1 2 3 4 5

3.2. Come valuti il tuo comportamento sulla raccolta differenziata dopo l'introduzione della tariffa puntuale? (punteggio: 1 per niente attento, 5 molto attento)

1 2 3 4 5

4. Quanto conosci (significato e dettagli) la tariffa puntuale introdotta dal tuo Comune? (punteggio: 1 per niente, 5: molto bene)

1 2 3 4 5

5. Hai suggerimenti o segnalazioni per migliorare la tariffa puntuale sui rifiuti?

.....
.....
.....
.....

Survey 2 was used in end June – July 2017 to calculate the "neutral baseline" (behaviours on prevention and recycling of a neutral sample) and will be repeated after X months.

Questionario sui comportamenti dei cittadini nella gestione dei rifiuti

Il questionario è anonimo e i dati raccolti saranno utilizzati ai fini statistici nell'ambito del Progetto Europeo Waste4Think di cui il Comune di Seveso è partner.

La tua opinione può anche essere utile al Comune per migliorare alcuni elementi nella gestione comunale dei rifiuti.

Data.....

Evento.....

6. Come valuti complessivamente la gestione dei rifiuti nel tuo Comune? (punteggio: 1 molto negativamente, 5: molto positivamente)

1 2 3 4 5

7. Metti in atto comportamenti per la prevenzione dei rifiuti?

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- Si
- No

7.1. Se si, quali?

- Acquisto prodotti sfusi per ridurre il packaging (detersivi, pasta, etc.) o scelgo prodotti con poco o nessun imballaggio
- Acquisto prodotti “concentrati”, “formato famiglia” o “ricaricabili” in modo da ridurre gli imballaggi
- Partecipo ad un “gruppo di acquisto sostenibile”
- Frequento centri del riuso, mercatini dell’usato, centri del baratto, etc.
- Uso l’acqua del rubinetto o mi rifornisco presso le Case dell’Acqua comunali per evitare di comprare acqua in bottigli
- Faccio un uso dei prodotti responsabile in modo da prolungare la loro vita utile (es. Attenta conservazione, controllo delle date di scadenza, riparo, riuso, etc.)
- Evito l’uso domestico e frequente di prodotti usa e getta (es. tovaglioli di carta, piatti, bicchieri e posate di plastica, etc.)
- Uso i pannolini lavabili per i miei bambini anziché quelli usa e getta
- Riduco l’uso di carta, preferendo i mezzi informatici, con fotocopie fronte/retro, usando i fogli da entrambi i lati
- Preferisco, quando possibile, ricevere comunicazioni e bollette on-line invece che in formato cartaceo
- Ridurre lo spreco alimentare
- Compostaggio domestico
- Altro_____

_____

- Risposta fuori tema

8. Come valuti il tuo comportamento sulla raccolta differenziata? (punteggio: 1 per niente attento, 5 molto attento)

1 2 3 4 5

Dove butteresti:

Sacco blu dell’indifferenziato Rifiuto organico/umido Sacco giallo del multileggero Vetro Carta e cartone Piattaforma ecologica Non so

8.1. Ossa e gusci di molluschi

8.2. CD

8.3. Lettiera del gatto

(Vegetali o argilla)

(Al silicio)

8.4. Posate di plastica

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8.5. Cartone della pizza senza residui di cibo

8.6. Carta assorbente da cucina e tovaglioli di carta unta di cibo

9. Hai suggerimenti o segnalazioni?

.....
.....
.....
.....

Initial survey about PAYT

Questionario sui comportamenti dei cittadini nella gestione dei rifiuti

Il questionario è anonimo e i dati raccolti saranno utilizzati ai fini statistici nell'ambito del Progetto Europeo Waste4Think di cui il Comune di Seveso è partner.

La tua opinione può anche essere utile al Comune per migliorare alcuni elementi nella gestione comunale dei rifiuti.

Data..... Evento.....

Quanto conosci (significato e dettagli) la tariffa puntuale introdotta dal tuo Comune? (punteggio: 1 per niente, 5: molto bene)

1 2 3 4 5

10. Come valuti l'introduzione della tariffa puntuale introdotta dal tuo Comune? (punteggio: 1 – per niente soddisfatto, 5: molto soddisfatto)

1 2 3 4 5 Non la conosco

Quanto conosci (significato e dettagli) la tariffa puntuale introdotta dal tuo Comune? (punteggio: 1 per niente, 5: molto bene)

1 2 3 4 5

11. Come valuti l'introduzione della tariffa puntuale introdotta dal tuo Comune? (punteggio: 1 – per niente soddisfatto, 5: molto soddisfatto)

1 2 3 4 5 Non la conosco

Quanto conosci (significato e dettagli) la tariffa puntuale introdotta dal tuo Comune? (punteggio: 1 per niente, 5: molto bene)

1 2 3 4 5

12. Come valuti l'introduzione della tariffa puntuale introdotta dal tuo Comune? (punteggio: 1 – per niente soddisfatto, 5: molto soddisfatto)

1 2 3 4 5 Non la conosco

Quanto conosci (significato e dettagli) la tariffa puntuale introdotta dal tuo Comune? (punteggio: 1 per niente, 5: molto bene)

1 2 3 4 5

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13. Come valuti l'introduzione della tariffa puntuale introdotta dal tuo Comune? (punteggio: 1 – per niente soddisfatto, 5: molto soddisfatto)

1 2 3 4 5 Non la conosco

Quanto conosci (significato e dettagli) la tariffa puntuale introdotta dal tuo Comune? (punteggio: 1 per niente, 5: molto bene)

1 2 3 4 5

14. Come valuti l'introduzione della tariffa puntuale introdotta dal tuo Comune? (punteggio: 1 – per niente soddisfatto, 5: molto soddisfatto)

1 2 3 4 5 Non la conosco

Quanto conosci (significato e dettagli) la tariffa puntuale introdotta dal tuo Comune? (punteggio: 1 per niente, 5: molto bene)

1 2 3 4 5

15. Come valuti l'introduzione della tariffa puntuale introdotta dal tuo Comune? (punteggio: 1 – per niente soddisfatto, 5: molto soddisfatto)

1 2 3 4 5 Non la conosco

Quanto conosci (significato e dettagli) la tariffa puntuale introdotta dal tuo Comune? (punteggio: 1 per niente, 5: molto bene)

1 2 3 4 5

16. Come valuti l'introduzione della tariffa puntuale introdotta dal tuo Comune? (punteggio: 1 – per niente soddisfatto, 5: molto soddisfatto)

1 2 3 4 5 Non la conosco

Quanto conosci (significato e dettagli) la tariffa puntuale introdotta dal tuo Comune? (punteggio: 1 per niente, 5: molto bene)

1 2 3 4 5

17. Come valuti l'introduzione della tariffa puntuale introdotta dal tuo Comune? (punteggio: 1 – per niente soddisfatto, 5: molto soddisfatto)

1 2 3 4 5 Non la conosco

Quanto conosci (significato e dettagli) la tariffa puntuale introdotta dal tuo Comune? (punteggio: 1 per niente, 5: molto bene)

1 2 3 4 5

18. Come valuti l'introduzione della tariffa puntuale introdotta dal tuo Comune? (punteggio: 1 – per niente soddisfatto, 5: molto soddisfatto)

1 2 3 4 5 Non la conosco

Quanto conosci (significato e dettagli) la tariffa puntuale introdotta dal tuo Comune? (punteggio: 1 per niente, 5: molto bene)

1 2 3 4 5

19. Come valuti l'introduzione della tariffa puntuale introdotta dal tuo Comune? (punteggio: 1 – per niente soddisfatto, 5: molto soddisfatto)

1 2 3 4 5 Non la conosco

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Quanto conosci (significato e dettagli) la tariffa puntuale introdotta dal tuo Comune? (punteggio: 1 per niente, 5: molto bene)

1 2 3 4 5

20. Come valuti l'introduzione della tariffa puntuale introdotta dal tuo Comune? (punteggio: 1 – per niente soddisfatto, 5: molto soddisfatto)

1 2 3 4 5 Non la conosco

Quanto conosci (significato e dettagli) la tariffa puntuale introdotta dal tuo Comune? (punteggio: 1 per niente, 5: molto bene)

1 2 3 4 5

21. Come valuti l'introduzione della tariffa puntuale introdotta dal tuo Comune? (punteggio: 1 – per niente soddisfatto, 5: molto soddisfatto)

1 2 3 4 5 Non la conosco

Quanto conosci (significato e dettagli) la tariffa puntuale introdotta dal tuo Comune? (punteggio: 1 per niente, 5: molto bene)

1 2 3 4 5

22. Come valuti l'introduzione della tariffa puntuale introdotta dal tuo Comune? (punteggio: 1 – per niente soddisfatto, 5: molto soddisfatto)

1 2 3 4 5 Non la conosco

Quanto conosci (significato e dettagli) la tariffa puntuale introdotta dal tuo Comune? (punteggio: 1 per niente, 5: molto bene)

1 2 3 4 5

23. Come valuti l'introduzione della tariffa puntuale introdotta dal tuo Comune? (punteggio: 1 – per niente soddisfatto, 5: molto soddisfatto)

1 2 3 4 5 Non la conosco

Quanto conosci (significato e dettagli) la tariffa puntuale introdotta dal tuo Comune? (punteggio: 1 per niente, 5: molto bene)

1 2 3 4 5

24. Come valuti l'introduzione della tariffa puntuale introdotta dal tuo Comune? (punteggio: 1 – per niente soddisfatto, 5: molto soddisfatto)

1 2 3 4 5 Non la conosco

Quanto conosci (significato e dettagli) la tariffa puntuale introdotta dal tuo Comune? (punteggio: 1 per niente, 5: molto bene)

1 2 3 4 5

25. Come valuti l'introduzione della tariffa puntuale introdotta dal tuo Comune? (punteggio: 1 – per niente soddisfatto, 5: molto soddisfatto)

1 2 3 4 5 Non la conosco

Quanto conosci (significato e dettagli) la tariffa puntuale introdotta dal tuo Comune? (punteggio: 1 per niente, 5: molto bene)

1 2 3 4 5

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26. Come valuti l'introduzione della tariffa puntuale introdotta dal tuo Comune? (punteggio: 1 – per niente soddisfatto, 5: molto soddisfatto)

1 2 3 4 5 Non la conosco

Quanto conosci (significato e dettagli) la tariffa puntuale introdotta dal tuo Comune? (punteggio: 1 per niente, 5: molto bene)

1 2 3 4 5

27. Come valuti l'introduzione della tariffa puntuale introdotta dal tuo Comune? (punteggio: 1 – per niente soddisfatto, 5: molto soddisfatto)

1 2 3 4 5 Non la conosco

Quanto conosci (significato e dettagli) la tariffa puntuale introdotta dal tuo Comune? (punteggio: 1 per niente, 5: molto bene)

1 2 3 4 5

28. Come valuti l'introduzione della tariffa puntuale introdotta dal tuo Comune? (punteggio: 1 – per niente soddisfatto, 5: molto soddisfatto)

1 2 3 4 5 Non la conosco

Quanto conosci (significato e dettagli) la tariffa puntuale introdotta dal tuo Comune? (punteggio: 1 per niente, 5: molto bene)

1 2 3 4 5

29. Come valuti l'introduzione della tariffa puntuale introdotta dal tuo Comune? (punteggio: 1 – per niente soddisfatto, 5: molto soddisfatto)

1 2 3 4 5 Non la conosco

Quanto conosci (significato e dettagli) la tariffa puntuale introdotta dal tuo Comune? (punteggio: 1 per niente, 5: molto bene)

1 2 3 4 5

30. Come valuti l'introduzione della tariffa puntuale introdotta dal tuo Comune? (punteggio: 1 – per niente soddisfatto, 5: molto soddisfatto)

1 2 3 4 5 Non la conosco

Quanto conosci (significato e dettagli) la tariffa puntuale introdotta dal tuo Comune? (punteggio: 1 per niente, 5: molto bene)

1 2 3 4 5

31. Come valuti l'introduzione della tariffa puntuale introdotta dal tuo Comune? (punteggio: 1 – per niente soddisfatto, 5: molto soddisfatto)

1 2 3 4 5 Non la conosco

Quanto conosci (significato e dettagli) la tariffa puntuale introdotta dal tuo Comune? (punteggio: 1 per niente, 5: molto bene)

1 2 3 4 5

32. Come valuti l'introduzione della tariffa puntuale introdotta dal tuo Comune? (punteggio: 1 – per niente soddisfatto, 5: molto soddisfatto)

1 2 3 4 5 Non la conosco

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Quanto conosci (significato e dettagli) la tariffa puntuale introdotta dal tuo Comune? (punteggio: 1 per niente, 5: molto bene)

1 2 3 4 5

33. Come valuti l'introduzione della tariffa puntuale introdotta dal tuo Comune? (punteggio: 1 – per niente soddisfatto, 5: molto soddisfatto)

1 2 3 4 5 Non la conosco

Quanto conosci (significato e dettagli) la tariffa puntuale introdotta dal tuo Comune? (punteggio: 1 per niente, 5: molto bene)

1 2 3 4 5

34. Come valuti l'introduzione della tariffa puntuale introdotta dal tuo Comune? (punteggio: 1 – per niente soddisfatto, 5: molto soddisfatto)

1 2 3 4 5 Non la conosco

Quanto conosci (significato e dettagli) la tariffa puntuale introdotta dal tuo Comune? (punteggio: 1 per niente, 5: molto bene)

1 2 3 4 5

35. Come valuti l'introduzione della tariffa puntuale introdotta dal tuo Comune? (punteggio: 1 – per niente soddisfatto, 5: molto soddisfatto)

1 2 3 4 5 Non la conosco

Quanto conosci (significato e dettagli) la tariffa puntuale introdotta dal tuo Comune? (punteggio: 1 per niente, 5: molto bene)

1 2 3 4 5

36. Come valuti l'introduzione della tariffa puntuale introdotta dal tuo Comune? (punteggio: 1 – per niente soddisfatto, 5: molto soddisfatto)

1 2 3 4 5 Non la conosco

Quanto conosci (significato e dettagli) la tariffa puntuale introdotta dal tuo Comune? (punteggio: 1 per niente, 5: molto bene)

1 2 3 4 5

37. Come valuti l'introduzione della tariffa puntuale introdotta dal tuo Comune? (punteggio: 1 – per niente soddisfatto, 5: molto soddisfatto)

1 2 3 4 5 Non la conosco

Quanto conosci (significato e dettagli) la tariffa puntuale introdotta dal tuo Comune? (punteggio: 1 per niente, 5: molto bene)

1 2 3 4 5

38. Come valuti l'introduzione della tariffa puntuale introdotta dal tuo Comune? (punteggio: 1 – per niente soddisfatto, 5: molto soddisfatto)

1 2 3 4 5 Non la conosco

Quanto conosci (significato e dettagli) la tariffa puntuale introdotta dal tuo Comune? (punteggio: 1 per niente, 5: molto bene)

1 2 3 4 5

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39. Come valuti l'introduzione della tariffa puntuale introdotta dal tuo Comune? (punteggio: 1 – per niente soddisfatto, 5: molto soddisfatto)

1 2 3 4 5 Non la conosco

Quanto conosci (significato e dettagli) la tariffa puntuale introdotta dal tuo Comune? (punteggio: 1 per niente, 5: molto bene)

1 2 3 4 5

40. Come valuti l'introduzione della tariffa puntuale introdotta dal tuo Comune? (punteggio: 1 – per niente soddisfatto, 5: molto soddisfatto)

1 2 3 4 5 Non la conosco

Quanto conosci (significato e dettagli) la tariffa puntuale introdotta dal tuo Comune? (punteggio: 1 per niente, 5: molto bene)

1 2 3 4 5

41. Come valuti l'introduzione della tariffa puntuale introdotta dal tuo Comune? (punteggio: 1 – per niente soddisfatto, 5: molto soddisfatto)

1 2 3 4 5 Non la conosco

Quanto conosci (significato e dettagli) la tariffa puntuale introdotta dal tuo Comune? (punteggio: 1 per niente, 5: molto bene)

1 2 3 4 5

42. Come valuti l'introduzione della tariffa puntuale introdotta dal tuo Comune? (punteggio: 1 – per niente soddisfatto, 5: molto soddisfatto)

1 2 3 4 5 Non la conosco

Quanto conosci (significato e dettagli) la tariffa puntuale introdotta dal tuo Comune? (punteggio: 1 per niente, 5: molto bene)

1 2 3 4 5

43. Come valuti l'introduzione della tariffa puntuale introdotta dal tuo Comune? (punteggio: 1 – per niente soddisfatto, 5: molto soddisfatto)

1 2 3 4 5 Non la conosco

Quanto conosci (significato e dettagli) la tariffa puntuale introdotta dal tuo Comune? (punteggio: 1 per niente, 5: molto bene)

1 2 3 4 5

44. Come valuti l'introduzione della tariffa puntuale introdotta dal tuo Comune? (punteggio: 1 – per niente soddisfatto, 5: molto soddisfatto)

1 2 3 4 5 Non la conosco

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Answers to questionnaire 1

Do you put in place actions aimed at waste prevemtion?
If yes, which ones?
Did you change your behavior about waste prevention after the introduction of
How do you evaluate your behaviour about waste prevention before the
How do you evaluate your behaviour about waste prevention after the
Did you change your behavior about separate collection after the introduction of
How do you evaluate your behaviour about separate collection before the
How do you evaluate your behaviour about separate collection after the
What's your knowledge (meaning and details) of the Pay As You Throw scheme
Do you have suggestions or issues to point out to improve the Pay As You Throw

D.1	
92%	
8%	
36	

D.1.1	
1. I purchase	9%
2. I purchase	11%
3. I am part o	3%
3. I visit reus	0%
4. I drink tap	10%
5. I use prodı	14%
6. I avoid sinı	19%
7. I use reusa	1%
8. I reduce th	11%
9. I prefer on	15%

D.2	
%YES	31%
%NO	69%
Empty	6

	D.2.1	D.2.2
1	0%	0%
2	0%	0%
3	39%	17%
4	35%	42%
5	23%	36%
Empty	6	6
Media	3,70	4,09

D.3	
%YES	33%
%NO	33%
Empty	24

	D.3.1	D3.2
1	0%	0%
2	0%	0%
3	38%	17%
4	33%	42%
5	26%	39%
Empty	24	24
Average	3,79	4,10

D.4	
1	0%
2	0%
3	38%
4	33%
5	26%
Empty	9

	D.5 (text)
Empty	157

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Answers to questionnaire 2

SURVEY	
D.1	How do you evaluate waste management in your Municipality overall?
D.2	Do you put in place actions aimed at waste prevemtion?
D.2.1	If yes, which ones?
D.3	How do you evaluate your behaviour about separate collection? (1-don't care at all 5-I care
D.3.1	Where would you throw: Bones and shells, CD, cat sand (natural, synthetic), plastic tablespoons, pizza cardboard without food scraps, greasy kitchen absorbent paper and napkins (% right answers)

RESULTS

D.1	
1	0%
2	0%
3	35%
4	59%
5	6%

D.2	
YES	76%
NO	24%

D2.1	Answers
1. I purchase products in bulk	15
2. I purchase concentrated, family size, or recharge	31
3. I am part of a fair purchase group	28
3. I visit reuse centres, charity shops etc.	39
4. I drink tap water / public water fountains	45
5. I use products in a responsible way	36
6. I avoid single usage products	50
7. I use reusable nappies	-
8. I reduce the consumption of paper	55
9. I prefer on-line communications and invoices	33
10. I reduce food wastage	46
11. Home composting	17
12. Other	5
13. Not relevant answer	-

D.3	
1	0%
2	0%
3	7%
4	73%
5	20%

D.3.1	
<20%	7%
20%-40%	40%
40%-60%	47%
60%-80%	0%
>80%	20%

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Annex 11 Halandri Surveys

SURVEY	TOTAL	756	
1	Do you participate in any of the municipality's actions/initiatives regarding recycling and good waste management practices?		
	YES	70	9,3%
	NO	686	90,7%
1.1	If yes, which one?		

Waste4Think		Household Composting		Separate selection of paper/cardboard (yellow bin)		Other		Open-Ended Response	
20	3%	9	1%	49	6%	264	35%	0	0%

1.2	If NO, why?		
	Will not bother	129	17,1%
	Mobility issue	6	0,8%
	Lack of time	4	0,5%
4	Do you have any good habits regarding waste prevention?		
	YES	539	71%
	NO	197	26%
4.1	Which one?		
	Composting	14	1,9%
	use as fertilizer	5	0,7%
	Recycling	35	4,6%
	Separation in the household	10	1,3%
5.	Do you do separate collecion at home?		
	YES	537	71,0%
	NO	219	29,0%
5.1	If not, Why?		
	I do not have enough space in the house	6	0,8%
	Lack of time	12	1,6%
	lack of proper knowledge	24	3,2%
	Lack of household bins for separation	18	2,4%
	It is not good for my health/it smells	0	0,0%
	There are not proper bins nearby	55	7,3%
	Bins are difficult to open	12	1,6%
	Separation is not obligatory	0	0,0%
	I pay my taxes, therefore i have no other obl	0	0,0%
	Other	92	12,2%
		219	

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Annex 12 Zamudio Surveys

Waste4Think Pregunta a la ciudadanía

Estimado/a zamudioztarra:

Nuestro municipio está inmerso en un ambicioso e interesante proyecto sobre residuos denominado Waste4Think.

Para conseguir los objetivos del mismo, entre otros: generar menos residuos, aumentar la recogida selectiva de residuos potenciar el reciclaje, implantar una tasa de residuos más justa y premiar a quien recicla y menos genera, necesitamos de su colaboración.

En definitiva, pretendemos un Zamudio más sostenible a nivel económico y medioambiental. Por ello, le pido que dedique unos minutos a rellenar esta encuesta.

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Hay 35 preguntas en esta encuesta

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Cláusula consentimiento informado

Gracias por leer esta información.

Nos gustaría que participases en un estudio relativo a los **hábitos de gestión de residuos** dentro del proyecto **Waste4Think** completando este cuestionario. Es completamente voluntario, pero sus respuestas nos resultarán de gran valor.

No necesitamos tu nombre ni ningún otro dato identificativo; el cuestionario se puede completar de forma anónima. Aunque no estaremos manejando ninguna información identificativa, los datos serán tratados de tal manera que se asegure la confidencialidad. Las respuestas individuales serán agregadas para el análisis y, una vez hecho esto, las encuestas individuales serán guardarán para conocer la *evolución de los hábitos de gestión de residuos de Zamudio durante la vida del proyecto (4 años).* Hasta ese momento, los cuestionarios serán almacenados en un *servidor de la Fundación Deusto*.

La información personal (como dirección o número de miembros en la familia) solo estarán accesible para el equipo investigador cuyo investigador principal es Ainhoa Alonso Vicario y el ayuntamiento de Zamudio y no serán desvelados.

Los resultados de la investigación forman parte de un estudio orientado a mejorar la gestión de residuos a nivel municipal reduciendo la generación y promoviendo buenos hábitos para la separación, prevención y reutilización de residuos. Si tienes alguna duda, puedes contactar con Iraia Oribe Garcia (iraia.oribe@deusto.es).

1 ¿Da su consentimiento a participar en la encuesta? *

Sólo conteste esta pregunta si se cumplen las siguientes condiciones:
quitSurvey == "No"

Por favor seleccione **sólo una** de las siguientes opciones:

- ◯ Sí
- ◯ No

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Información sobre el hogar

2 Domicilio (calle y nº de portal)

Por favor, escriba su respuesta aquí:

3 Género

Por favor seleccione **sólo una** de las siguientes opciones:

- ◯ Femenino
- ◯ Masculino

4 ¿Cuántas personas conviven en su hogar, incluido usted?
Sólo se pueden introducir números en este campo.

Por favor, escriba su respuesta aquí:

-

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Prevención y hábitos de consumo

5 Indique la frecuencia de desayuno, comida y cena en su domicilio (*dias de la semana por persona*)

	Todos los días(6-7)	Algunos días (4-5)	Pocos días (3-2-1)
Desayuno			
Comida			
Cena			

6 ¿Lleva sus propias bolsas y/o carro de la compra para evitar usar bolsas de plástico?

Por favor seleccione **sólo una** de las siguientes opciones:

- ◯ Siempre o la mayoría de las veces
- ◯ A veces
- ◯ Nunca

Comente su elección aquí:

7 ¿Compra a granel?

Por favor seleccione **sólo una** de las siguientes opciones:

- ◯ Siempre o la mayoría de las veces
- ◯ A veces
- ◯ Nunca

Comente su elección aquí:

8 ¿Hace sus compras en el comercio local?

Por favor seleccione **sólo una** de las siguientes opciones:

- ◯ Siempre o la mayoría de las veces
- ◯ A veces
- ◯ Nunca

Comente su elección aquí:

9 ¿Compra preferiblemente productos de temporada?

Por favor seleccione **sólo una** de las siguientes opciones:

- ◯ Siempre o la mayoría de las veces
- ◯ A veces
- ◯ Nunca

Comente su elección aquí:

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10 ¿Utiliza envases reutilizables (tupper, boc'n'roll,...) cuando prepara el almuerzo o la merienda?

Por favor seleccione **sólo una** de las siguientes opciones:

- ◯ Siempre o la mayoría de las veces
- ◯ A veces
- ◯ Nunca

Comente su elección aquí:

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Hábitos de separación de residuos

11 ¿Separa en casa los residuos que genera según las diferentes fracciones?

Por favor seleccione **sólo una** de las siguientes opciones:

- ◯ Sí, separo todas las fracciones
- ◯ No, lo deposito todo junto
- ◯ A veces
- ◯ Según la fracción

Comente su elección aquí:

12 No separa los residuos y los echa todos en la misma bolsa, separa según la fracción y/o según el día porque...

Sólo conteste esta pregunta si se cumplen las siguientes condiciones:
La respuesta NO fue 'Sí, separo todas las fracciones' en la pregunta '11 [Q11]' (¿Separa en casa los residuos que genera según las diferentes fracciones?)

Por favor, marque las opciones que correspondan:

- ☐ Falta de espacio en casa
- ☐ Creo que es difícil
- ☐ Me resulta incómodo separar
- ☐ No creo en el reciclaje
- ☐ Los contenedores están lejos de mi casa
- ☐ Los contenedores suelen estar llenos
- ☐ Los contenedores no están accesible (no alcanzo la puerta del contenedor, mal localizados,...)
- ☐ Desconozco qué echar en cada contenedor
- ☐ Otro:

13 ¿Deposita los restos de frutas y verduras en el contenedor marrón o en una autocompostadora para hacer compost?

Por favor seleccione **sólo una** de las siguientes opciones:

- ◯ Contenedor marrón
- ◯ Autocompostadora
- ◯ Ambos
- ◯ No uso

14 ¿Dónde vierte el aceite que ha utilizado para cocinar?

Por favor seleccione **sólo una** de las siguientes opciones:

- ◯ En el contenedor para aceite doméstico (naranja)
- ◯ La tiro la fregadera o al inodoro
- ◯ Otro

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15 ¿Cuál es el motivo principal de que no utilice el contenedor naranja para el reciclaje del aceite?

Sólo conteste esta pregunta si se cumplen las siguientes condiciones:
La respuesta NO fue 'En el contenedor para aceite doméstico (naranja)' en la pregunta '14 [Q14]' (¿Dónde vierte el aceite que ha utilizado para cocinar?)

Por favor, marque las opciones que correspondan:

- ☐ El contenedor está lejos
- ☐ El sistema de recogida no me gusta
- ☐ No creo en el reciclaje del aceite
- ☐ Otro:

16 Indique dónde deposita usted los siguientes residuos

	Amarillo (envases ligeros)	Azul (papel - cartón)	Iglú verde (cristal)	Naranja (aceite)	Gris (resto)	Blanco (reutilizables)	Marrón (orgánico)	Garbigune	Establecimiento especializado (farmacia, ferreteria,...)
Medicamentos caducados	☐	☐	☐	☐	☐	☐	☐	☐	☐
Papel de aluminio	☐	☐	☐	☐	☐	☐	☐	☐	☐
Bombillas inservibles	☐	☐	☐	☐	☐	☐	☐	☐	☐
Trozos de cristal	☐	☐	☐	☐	☐	☐	☐	☐	☐
Bolsas de basura	☐	☐	☐	☐	☐	☐	☐	☐	☐
Bandejas de alimentos	☐	☐	☐	☐	☐	☐	☐	☐	☐
Ropa	☐	☐	☐	☐	☐	☐	☐	☐	☐
Móviles	☐	☐	☐	☐	☐	☐	☐	☐	☐
Libros	☐	☐	☐	☐	☐	☐	☐	☐	☐
Cartuchos tóner	☐	☐	☐	☐	☐	☐	☐	☐	☐

17 ¿Qué vía utiliza para desprenderse de lo voluminosos o enseres?

Por favor, marque las opciones que correspondan:

- ☐ Llamo al ayuntamiento para que den aviso al servicio de recogida
- ☐ Los llevo al garbigune
- ☐ Llamo a alguna entidad sin ánimo de lucro
- ☐ Los dejo en la calle junto a los contenedores

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- ☐ Otro:

18 Si genera pañales o prevé que los pueda hacer, ¿estaría dispuesto/a a separarlos y depositarlos en un contenedor selectivo a fin de que puedan utilizarse por ejemplo en la generación de energía?

Por favor seleccione **sólo una** de las siguientes opciones:

- ○ Sí
- ○ No

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Puntos limpios

19 ¿Sabe usted que en las cercanías de su municipio existe un punto limpio (garbigune) y su función?

Por favor seleccione sólo una de las siguientes opciones:

- ○ Sí
- ○ No

20 ¿Eres usuaria/o del Garbigune?

Por favor seleccione sólo una de las siguientes opciones:

- ○ Sí
- ○ No

21 Si es usuaria/o del garbigune, indique qué residuos de los que se listan a continuación deposita en el garbigune

Sólo conteste esta pregunta si se cumplen las siguientes condiciones:
La respuesta fue 'Sí' en la pregunta '20 [Q19]' (¿Eres usuaria/o del Garbigune?)

Por favor, marque las opciones que correspondan:

- ☐ Sillas de plástico, Persianas
- ☐ Fluorescentes
- ☐ Vídeos
- ☐ Neveras, Televisores, ordenadores, microondas
- ☐ Juguetes
- ☐ Marcos de puerta
- ☐ Lavabos, inodoros
- ☐ Cápsulas de café
- ☐ Aceites de coche
- ☐ Cartuchos de tóner
- ☐ Botellas
- ☐ Termómetros de mercurio
- ☐ Restos de poda, arbustos
- ☐ Pinturas, disolventes, aerosoles
- ☐ Radiografías
- ☐ Otro:

22 Si no utiliza el garbigune, ¿cuál es el motivo principal?

Sólo conteste esta pregunta si se cumplen las siguientes condiciones:
La respuesta fue 'No' en la pregunta '20 [Q19]' (¿Eres usuaria/o del Garbigune?)

Por favor, marque las opciones que correspondan:

- ☐ Está lejos de casa
- ☐ Echo todos los residuos a los contenedores y el ayuntamiento te recoge los enseres
- ☐ Desconozco qué residuos se recogen en el Garbigune

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- ☐ Otro:

23 ¿Si el municipio contara con un punto limpio móvil depositarías los residuos en él?

Por favor seleccione sólo una de las siguientes opciones:

- ○ Sí
- ○ No

24 Indique si tiene dificultades para depositar los siguientes residuos

Por favor, seleccione la respuesta apropiada para cada concepto:

	Sí	Dudoso	No
Sillas de plástico, Persianas	○	○	○
Fluorescentes	○	○	○
Vídeos	○	○	○
Neveras, Televisores, ordenadores, microondas	○	○	○
Juguetes	○	○	○
Marcos de puerta	○	○	○
Lavabos, inodoros	○	○	○
Cápsulas de café	○	○	○
Aceites de coche	○	○	○
Cartuchos de tóner	○	○	○
Botellas	○	○	○
Termómetros de mercurio	○	○	○
Restos de poda, arbustos	○	○	○
Pinturas, disolventes, aerosoles	○	○	○
Radiografías	○	○	○

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Fiscalidad e introducción de la tecnología

25 ¿Cuál cree que es el residuo cuya gestión resulta más costosa en términos económicos?

Por favor seleccione sólo una de las siguientes opciones:

- ◯ Todas cuestan lo mismo
- ◯ Las recogidas selectivamente (papel y cartón, vidrio,...)
- ◯ La basura ordinaria

26 ¿Considera que todas y todos debemos pagar la misma tasa de basura o que se debe pagar en función de lo que se genera?

Por favor seleccione sólo una de las siguientes opciones:

- ◯ Sí, todos y todas debemos pagar lo mismo
- ◯ No, se debe pagar función de los que se genera

27 ¿Cómo debería conocer el ayuntamiento la generación de residuos de los y las zamudioztarras?

Sólo conteste esta pregunta si se cumplen las siguientes condiciones:
La respuesta fue 'No, se debe pagar función de los que se genera' en la pregunta '26 [Q26]' (¿Considera que todas y todos debemos pagar la misma tasa de basura o que se debe pagar en función de lo que se genera?)

Por favor, marque las opciones que correspondan:

- ☐ Mediante la incorporación de la tecnología para la identificar al usuario/a (por ejemplo con la tarjeta ciudadana), cuantificar y controlar la generación
- ☐ Mediante la compra de bolsas homologadas para el depósito de residuos
- ☐ Mediante un sistema individual de recogida de residuos donde cada usuario/a tenga su punto único de depósito de residuos (puerta a puerta)
- ☐ Otro:

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Grado de satisfacción con el servicio de recogida de residuos y limpieza viaria

28 Indique su nivel de satisfacción con los siguientes aspectos del servicio de recogida de residuos (1 muy poco satisfecho, 5 muy satisfecho)

Por favor, seleccione la respuesta apropiada para cada concepto:

	1	2	3	4	5
Limpieza y mantenimiento de los contenedores	○	○	○	○	○
Frecuencia de recogida	○	○	○	○	○
Números de contenedores	○	○	○	○	○
Cercanía a su hogar	○	○	○	○	○
Fracciones que se recogen	○	○	○	○	○

29 Este es su espacio para dejar sugerencias sobre cómo reducir la generación de residuos y/o aumentar el reciclaje

Por favor, escriba su respuesta aquí:

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Participación activa

30 ¿Participaría en un grupo de trabajo para mejor el sistema de recogida de residuos de Zamudio?

Por favor seleccione **sólo una** de las siguientes opciones:

- ◯ Sí
- ◯ No

31 Política de Protección de Datos de Carácter Personal

Si estás interesado en **participar activamente en un grupo de trabajo para mejorar la gestión de residuos en Zamudio**, puede dejarnos su dirección de correo electrónico. En caso de que lo haga, y en cumplimiento de la Ley Orgánica 15/1999, de 13 de diciembre, sobre protección de Datos de Carácter Personal (LOPD) desde **el ayuntamiento de Zamudio** le informamos de que, en virtud de lo establecido en la Ley 34/2002, de 11 de julio, de Servicios de la Sociedad de la Información y de Comercio Electrónico, **el ayuntamiento de Zamudio** podrá utilizar las direcciones de correo electrónico facilitadas por usted exclusivamente para **facilitarle información relativa al proyecto Waste4think**. Usted da su consentimiento expreso para que el **ayuntamiento de Zamudio** pueda utilizar su dirección de correo electrónico con este fin concreto.
Usted podrá, en todo momento, ejercitar los derechos reconocidos en la LOPD, de acceso, rectificación, cancelación y oposición. El ejercicio de estos derechos puede realizarlo el propio usuario mediante correo electrónico enviado a: udala@zamudiokoudala.net

Sólo conteste esta pregunta si se cumplen las siguientes condiciones:
La respuesta fue 'Sí' en la pregunta '30 [Q30]' (¿Participaría en un grupo de trabajo para mejor el sistema de recogida de residuos de Zamudio?)

Por favor seleccione **sólo una** de las siguientes opciones:

- ◯ Sí
- ◯ No

32 Datos de contacto *

Sólo conteste esta pregunta si se cumplen las siguientes condiciones:
La respuesta fue 'Sí' en la pregunta '31 [q99]' (Política de Protección de Datos de Carácter Personal Si estás interesado en participar activamente en un grupo de trabajo para mejorar la gestión de residuos en Zamudio, puede dejarnos su dirección de correo electrónico. En caso de que lo haga, y en cumplimiento de la Ley Orgánica 15/1999, de 13 de diciembre, sobre protección de Datos de Carácter Personal (LOPD) desde el ayuntamiento de Zamudio le informamos de que, en virtud de lo establecido en la Ley 34/2002, de 11 de julio, de Servicios de la Sociedad de la Información y de Comercio Electrónico, el ayuntamiento de Zamudio podrá utilizar las direcciones de correo electrónico facilitadas por usted exclusivamente para facilitarle información relativa al proyecto Waste4think. Usted da su consentimiento expreso para que el ayuntamiento de Zamudio pueda utilizar su dirección de correo electrónico con este fin concreto. Usted podrá, en todo momento, ejercitar los derechos reconocidos en la LOPD, de acceso, rectificación, cancelación y oposición. El ejercicio de estos derechos puede realizarlo el propio usuario mediante correo electrónico enviado a: udala@zamudiokoudala.net)

Nombre

Email

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33 ¿Le gustaría recibir información sobre el proyecto Waste4Think?

Sólo conteste esta pregunta si se cumplen las siguientes condiciones:
La respuesta fue 'No' en la pregunta '30 [Q30]' (¿Participaría en un grupo de trabajo para mejor el sistema de recogida de residuos de Zamudio?)

Por favor seleccione sólo una de las siguientes opciones:

- ◯ Sí
- ◯ No

34 Política de Protección de Datos de Carácter Personal
Si estás interesado en participar activamente en un grupo de trabajo para mejorar la gestión de residuos en Zamudio, puede dejarnos su dirección de correo electrónico. En caso de que lo haga, y en cumplimiento de la Ley Orgánica 15/1999, de 13 de diciembre, sobre protección de Datos de Carácter Personal (LOPD) desde el ayuntamiento de Zamudio le informamos de que, en virtud de lo establecido en la Ley 34/2002, de 11 de julio, de Servicios de la Sociedad de la Información y de Comercio Electrónico, el ayuntamiento de Zamudio podrá utilizar las direcciones de correo electrónico facilitadas por usted exclusivamente para facilitarle información relativa al proyecto Waste4think. Usted da su consentimiento expreso para que el ayuntamiento de Zamudio pueda utilizar su dirección de correo electrónico con este fin concreto.
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Sólo conteste esta pregunta si se cumplen las siguientes condiciones:
La respuesta fue 'Sí' en la pregunta '33 [q0000]' (¿Le gustaría recibir información sobre el proyecto Waste4Think?)

Por favor seleccione sólo una de las siguientes opciones:

- ◯ Sí
- ◯ No

35 Datos de contacto *

Sólo conteste esta pregunta si se cumplen las siguientes condiciones:
La respuesta fue 'Sí' en la pregunta '34 [q1111]' (Política de Protección de Datos de Carácter Personal Si estás interesado en participar activamente en un grupo de trabajo para mejorar la gestión de residuos en Zamudio, puede dejarnos su dirección de correo electrónico. En caso de que lo haga, y en cumplimiento de la Ley Orgánica 15/1999, de 13 de diciembre, sobre protección de Datos de Carácter Personal (LOPD) desde el ayuntamiento de Zamudio le informamos de que, en virtud de lo establecido en la Ley 34/2002, de 11 de julio, de Servicios de la Sociedad de la Información y de Comercio Electrónico, el ayuntamiento de Zamudio podrá utilizar las direcciones de correo electrónico facilitadas por usted exclusivamente para facilitarle información relativa al proyecto Waste4think. Usted da su consentimiento expreso para que el ayuntamiento de Zamudio pueda utilizar su dirección de correo electrónico con este fin concreto. Usted podrá, en todo momento, ejercitar los derechos reconocidos en la LOPD, de acceso, rectificación, cancelación y oposición. El ejercicio de estos derechos puede realizarlo el propio usuario mediante correo electrónico enviado a: udala@zamudiokoudala.net)

Nombre

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Email

Enviar su encuesta.
Gracias por completar esta encuesta.

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Waste4Think pregunta a comercios

Estimado/a comerciante:

Nuestro municipio está inmerso en un ambicioso e interesante proyecto sobre residuos denominado Waste4Think.

Para conseguir los objetivos del mismo, entre otros: generar menos residuos, aumentar la recogida selectiva de residuos potenciar el reciclaje, implantar una tasa de residuos más justa e premiar a quien recicla y menos genera, necesitamos de su colaboración.

En definitiva, pretendemos un Zamudio más sostenible a nivel económico y medioambiental. Por ello, le pido que dedique unos minutos a rellenar esta encuesta.

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Hay 25 preguntas en esta encuesta

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Cláusula de consentimiento informado

Gracias por leer esta información.

Nos gustaría que participases en un estudio relativo a los hábitos de gestión de residuos dentro del proyecto Waste4Think completando este cuestionario. Es completamente voluntario, pero sus respuestas nos resultarán de gran valor.

No necesitamos tu nombre ni ningún otro dato identificativo; el cuestionario se puede completar de forma anónima. Aunque no estaremos manejando ninguna información identificativa, los datos serán tratados de tal manera que se asegure la confidencialidad. Las respuestas individuales serán agregadas para el análisis y, una vez hecho esto, las encuestas individuales serán guardarán para conocer la evolución de los hábitos de gestión de residuos de Zamudio durante la vida del proyecto (4 años). Hasta ese momento, los cuestionarios serán almacenados en un servidor de la Fundación Deusto.

La información personal (como dirección o número de miembros en la familia) solo estarán accesible para el equipo investigador cuyo investigador principal es Ainhoa Alonso Vicario y no serán desvelados.

Los resultados de la investigación forman parte de un estudio orientado a mejorar la gestión de residuos a nivel municipal reduciendo la generación y promoviendo buenos hábitos para la separación, prevención y reutilización de residuos. Si tienes alguna duda, puedes contactar con Iraia Oribe Garcia (iraia.oribe@deusto.es).

1 ¿Da su consentimiento para participar en la encuesta? *

Por favor seleccione sólo una de las siguientes opciones:

- ○ Sí
- ○ No

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Información general de los comercios

2 Actividad o tipo de negocio

Por favor, escriba su respuesta aquí:

3 Quien cumplimenta este cuestionario es

Por favor seleccione sólo una de las siguientes opciones:

- ◯ Propietario/a
- ◯ Empleado/a

4 Dirección

Por favor, escriba su respuesta aquí:

5 Teléfono

Sólo se pueden introducir números en este campo.

Por favor, escriba su respuesta aquí:

-

6 Email

Por favor, escriba su respuesta aquí:

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Hábitos de separación

7 ¿De los siguientes residuos cuáles genera en su negocio?

Por favor, marque las opciones que correspondan:

- ☐ Envases de plástico
- ☐ Pescado
- ☐ Frutas, verduras
- ☐ Pan
- ☐ Papel y cartón
- ☐ Carne
- ☐ Envases metálicos
- ☐ Vidrio
- ☐ Otro:

8 ¿Separa los residuos que generan según las diferentes fracciones?

Por favor seleccione **sólo una** de las siguientes opciones:

- ○ Sí, separo todas las fracciones
- ○ No, lo deposito todo junto
- ○ A veces
- ○ Según la fracción

9 Si deposita todos los residuos conjuntamente o lo hace según la fracción ¿cuál son los motivos?

Sólo conteste esta pregunta si se cumplen las siguientes condiciones:
La respuesta NO fue 'Sí, separo todas las fracciones' en la pregunta '8 [q7]' (¿Separa los residuos que generan según las diferentes fracciones?)

Por favor, marque las opciones que correspondan:

- ☐ Falta de tiempo
- ☐ Falta de espacio para guardar los cubos de los distintos tipos de residuos
- ☐ No tengo claro qué residuos tengo que depositar en cada contenedor
- ☐ No creo en el reciclaje
- ☐ Los contenedores están lejos
- ☐ Los contenedores suelen estar llenos
- ☐ El contenedor no está accesible (apertura, localización,...)
- ☐ Otro:

10 ¿Antes de echar las cajas de cartón al contenedor azul las desarma y pliega para ocupar menos espacio?

Por favor seleccione **sólo una** de las siguientes opciones:

- ○ Sí
- ○ No

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Fiscalidad e introducción de tecnología

11 ¿Cuál cree que es el residuo cuya gestión nos resulta más costosa en términos económicos?

Por favor seleccione sólo una de las siguientes opciones:

- ◯ Todos cuestan lo mismo
- ◯ Los selectivos (papel y cartón, vidrio,...)
- ◯ La basura ordinaria
- ◯ Otro

12 ¿Consideras que todo establecimiento comercial debe pagar la misma tasa de basura?

Por favor seleccione sólo una de las siguientes opciones:

- ◯ Sí, todos y todas debemos pagar lo mismo
- ◯ No, se debe aplicar una tasa diferenciada

13 ¿Qué criterio cree que sería más justo aplicar a la hora de fijar la tasa de basuras?

Sólo conteste esta pregunta si se cumplen las siguientes condiciones:
La respuesta NO fue 'No, se debe aplicar una tasa diferenciada' en la pregunta '12 [q09]' (¿Consideras que todo establecimiento comercial debe pagar la misma tasa de basura?)

Por favor, marque las opciones que correspondan:

- ☐ M2 del local
- ☐ Cantidad de residuos generados
- ☐ NS/NC
- ☐ Otro:

14 ¿Cree que se debería aplicar una bonificación a quién deposita los residuos de forma separada?

Por favor seleccione sólo una de las siguientes opciones:

- ◯ Sí
- ◯ No

15 ¿Cómo debería conocer el ayuntamiento la generación de residuos y la participación en la recogida separada de residuos de los comercios para poder premiar a quien lo hace o establecer la tasa de basuras según la cantidad de residuos generados?

Por favor, marque las opciones que correspondan:

- ☐ Mediante la incorporación de la tecnología para la identificar al usuario/a (por ejemplo con la tarjeta ciudadana), cuantificar y controlar la generación
- ☐ Mediante la compra de bolsas homologadas para el depósito de residuos

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- ☐ Mediante un sistema individual de recogida de residuos donde cada usuario/a tenga su punto único de depósito de residuos (puerta a puerta)
- ☐ Otro:

16 Indique si cree que usar la tarjeta electrónica en todos los contenedores sería útil para los siguientes aspectos

Por favor, marque las opciones que correspondan:

- ☐ Reducir la presencia de residuos impropios
- ☐ Aumentar la recogida separada de residuos
- ☐ Determinar la tasa de basura

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Participación en campañas de sensibilización y prevención

17 La mancomunidad lleva años desarrollando una campaña en los comercios que venden fruta, verdura, pan, café y bolsas de infusiones, para fomentar su depósito en el contenedor marrón. En los comercios adheridos se entrega la compra a la clientela usuaria del contenedor marrón en bolsas compostables. Dichos clientes las reutilizan para depositar los residuos orgánicos. ¿Está adherida/o a la campaña para facilitar bolsas compostables, con asas, a los usuarios y usuarias de quinto contenedor?

Por favor seleccione sólo una de las siguientes opciones:

- ◯ Sí
- ◯ No

18 Teniendo en cuenta que facilitamos a los comercios adheridos las bolsas compostables gratuitamente, ¿colaboraría con el ayuntamiento en esta iniciativa adheriéndose a la campaña?

Sólo conteste esta pregunta si se cumplen las siguientes condiciones:
La respuesta fue 'No' en la pregunta '17 [q10]' (La mancomunidad lleva años desarrollando una campaña en los comercios que venden fruta, verdura, pan, café y bolsas de infusiones, para fomentar su depósito en el contenedor marrón. En los comercios adheridos se entrega la compra a la clientela usuaria del contenedor marrón en bolsas compostables. Dichos clientes las reutilizan para depositar los residuos orgánicos. ¿Está adherida/o a la campaña para facilitar bolsas compostables, con asas, a los usuarios y usuarias de quinto contenedor?)

Por favor seleccione sólo una de las siguientes opciones:

- ◯ Sí
- ◯ No

19 Si ya participa en la campaña ¿a quién le solicita más bolsas cuando se le terminan?

Sólo conteste esta pregunta si se cumplen las siguientes condiciones:
La respuesta fue 'Sí' en la pregunta '17 [q10]' (La mancomunidad lleva años desarrollando una campaña en los comercios que venden fruta, verdura, pan, café y bolsas de infusiones, para fomentar su depósito en el contenedor marrón. En los comercios adheridos se entrega la compra a la clientela usuaria del contenedor marrón en bolsas compostables. Dichos clientes las reutilizan para depositar los residuos orgánicos. ¿Está adherida/o a la campaña para facilitar bolsas compostables, con asas, a los usuarios y usuarias de quinto contenedor?)

Por favor, marque las opciones que correspondan:

- ☐ A la Mancomunidad
- ☐ Al Ayuntamiento
- ☐ Desconocía que podía pedir más bolsas
- ☐ NS/NC
- ☐ Otro:

20 En el caso que desde el ayuntamiento o la Mancomunidad se organizasen campañas que no implicasen gasto económico para su comercio, para fomentar que generemos menos residuos, que aumentemos el reciclaje y objetivos similares, ¿estaría usted dispuesto a colaborar?
Por favor seleccione sólo una de las siguientes opciones:

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- ○ Sí
- ○ No

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Nivel de satisfacción

21

Indique su nivel de satisfacción con los siguientes aspectos el servicio de recogida de residuos (1 muy poco satisfecho, 5 muy satisfecho)

Por favor, seleccione la respuesta apropiada para cada concepto:

	1	2	3	4	5
Limpieza y mantenimiento de los contenedores	○	○	○	○	○
Frecuencia de recogida	○	○	○	○	○
Números de contenedores	○	○	○	○	○
Cercanía a su hogar	○	○	○	○	○
Fracciones que se recogen	○	○	○	○	○

22 ¿Tiene alguna propuesta o sugerencia para mejorar la recogida selectiva y/o disminuir la generación de residuos?

Por favor, escriba su respuesta aquí:

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Participación activa

23 ¿Le gustaría recibir información sobre el proyecto Waste4Think?

Por favor seleccione sólo una de las siguientes opciones:

- ◯ Sí
- ◯ No

24 Política de Protección de Datos de Carácter Personal

Si estás interesado en participar activamente en un grupo de trabajo para mejorar la gestión de residuos en Zamudio, puede dejarnos su dirección de correo electrónico. En caso de que lo haga, y en cumplimiento de la Ley Orgánica 15/1999, de 13 de diciembre, sobre protección de Datos de Carácter Personal (LOPD) desde el ayuntamiento de Zamudio le informamos de que, en virtud de lo establecido en la Ley 34/2002, de 11 de julio, de Servicios de la Sociedad de la Información y de Comercio Electrónico, el ayuntamiento de Zamudio podrá utilizar las direcciones de correo electrónico facilitadas por usted exclusivamente para facilitarle información relativa al proyecto Waste4think. Usted da su consentimiento expreso para que el ayuntamiento de Zamudio pueda utilizar su dirección de correo electrónico con este fin concreto.
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Sólo conteste esta pregunta si se cumplen las siguientes condiciones:
La respuesta fue 'Sí' en la pregunta '23 [q123]' (¿Le gustaría recibir información sobre el proyecto Waste4Think?)

Por favor seleccione sólo una de las siguientes opciones:

- ◯ Sí
- ◯ No

25 Datos de contacto

Sólo conteste esta pregunta si se cumplen las siguientes condiciones:
La respuesta fue 'Sí' en la pregunta '24 [q234]' (Política de Protección de Datos de Carácter Personal Si estás interesado en participar activamente en un grupo de trabajo para mejorar la gestión de residuos en Zamudio, puede dejarnos su dirección de correo electrónico. En caso de que lo haga, y en cumplimiento de la Ley Orgánica 15/1999, de 13 de diciembre, sobre protección de Datos de Carácter Personal (LOPD) desde el ayuntamiento de Zamudio le informamos de que, en virtud de lo establecido en la Ley 34/2002, de 11 de julio, de Servicios de la Sociedad de la Información y de Comercio Electrónico, el ayuntamiento de Zamudio podrá utilizar las direcciones de correo electrónico facilitadas por usted exclusivamente para facilitarle información relativa al proyecto Waste4think. Usted da su consentimiento expreso para que el ayuntamiento de Zamudio pueda utilizar su dirección de correo electrónico con este fin concreto. Usted podrá, en todo momento, ejercitar los derechos reconocidos en la LOPD, de acceso, rectificación, cancelación y oposición. El ejercicio de estos derechos puede realizarlo el propio usuario mediante correo electrónico enviado a: udala@zamudiokoudala.net)

Nombre

Email

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Enviar su encuesta.
Gracias por completar esta encuesta.

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Waste4Think pregunta a empresas

Estimado/a responsable de medioambiente:

Nuestro municipio está inmerso en un ambicioso e interesante proyecto sobre residuos denominado Waste4Think.

Para conseguir los objetivos del mismo, entre otros: generar menos residuos, aumentar la recogida selectiva de residuos potenciar el reciclaje, implantar una tasa de residuos más justa e premiar a quien recicla y menos genera, necesitamos de su colaboración.

En definitiva, pretendemos un Zamudio más sostenible a nivel económico y medioambiental. Por ello, le pido que dedique unos minutos a rellenar esta encuesta.

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Hay 28 preguntas en esta encuesta

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Cláusula de consentimiento informado

Gracias por leer esta información.

Nos gustaría que participases en un estudio relativo a los hábitos de gestión de residuos dentro del proyecto Waste4Think completando este cuestionario. Es completamente voluntario, pero sus respuestas nos resultarán de gran valor.

No necesitamos tu nombre ni ningún otro dato identificativo; el cuestionario se puede completar de forma anónima. Aunque no estaremos manejando ninguna información identificativa, los datos serán tratados de tal manera que se asegure la confidencialidad. Las respuestas individuales serán agregadas para el análisis y, una vez hecho esto, las encuestas individuales serán guardarán para conocer la evolución de los hábitos de gestión de residuos de Zamudio durante la vida del proyecto (4 años). Hasta ese momento, los cuestionarios serán almacenados en un servidor de la Fundación Deusto.

La información personal (como dirección o número de miembros en la familia) solo estarán accesible para el equipo investigador cuyo investigador principal es Ainhoa Alonso Vicario y no serán desvelados.

Los resultados de la investigación forman parte de un estudio orientado a mejorar la gestión de residuos a nivel municipal reduciendo la generación y promoviendo buenos hábitos para la separación, prevención y reutilización de residuos. Si tienes alguna duda, puedes contactar con Iraia Oribe Garcia (iraia.oribe@deusto.es).

1 ¿Da su consentimiento para participar en la encuesta? *

Por favor seleccione sólo una de las siguientes opciones:

- ○ Sí
- ○ No

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Información general de la empresa

2 Nombre/Razón social de la empresa

Por favor, escriba su respuesta aquí:

3 Dirección

Por favor, escriba su respuesta aquí:

4 Email

Por favor, escriba su respuesta aquí:

5 Teléfono
Sólo se pueden introducir números en este campo.

Por favor, escriba su respuesta aquí:

-

6 Quien cumplimenta este cuestionario es

Por favor seleccione **sólo una** de las siguientes opciones:

- ◯ Propietario/a ó Gerente
- ◯ Empleado/a

7 M2 de superficie
Sólo se pueden introducir números en este campo.

Por favor, escriba su respuesta aquí:

-

8 Número de Trabajadores
Sólo se pueden introducir números en este campo.

Por favor, escriba su respuesta aquí:

-

9 ¿Dispone su empresa de un comedor?

Por favor seleccione **sólo una** de las siguientes opciones:

- ◯ Sí
- ◯ No

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Sistema de recogida y flota de contenedores

10 Indique el número de contenedores de los que dispone según el siguiente listado

	Número de contenedores
RSU (basura ordinaria)	
Papel y cartón (azul)	
Vidrio (verde)	
Envases ligeros (amarillo)	
Materia orgánica (marrón)	

11 Indique de quién son propiedad de los contenedores

Por favor, seleccione la respuesta apropiada para cada concepto:

	De su empresa	De la mancomunidad o ayuntamiento	NS / NC
RSU (basura ordinaria)	○	○	○
Papel y cartón (azul)	○	○	○
Vidrio (verde)	○	○	○
Envases ligeros (amarillo)	○	○	○
Materia orgánica (marrón)	○	○	○

12 Indique la tipología de uso de los contenedores

Por favor, seleccione la respuesta apropiada para cada concepto:

	Uso exclusivo	Uso compartido con otros empresas
RSU (basura ordinaria)	○	○
Papel y cartón (azul)	○	○
Vidrio (verde)	○	○
Envases ligeros (amarillo)	○	○
Materia orgánica (marrón)	○	○

13 Indique si tienen otros contenedores para la recogida de residuos *(fracción-número-propietario-uso)*

Por favor, escriba su respuesta aquí:

14 Indique el procedimiento para depositar los residuos de las siguientes fracciones

Por favor, seleccione la respuesta apropiada para cada concepto:

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	Dentro de las Instalaciones y los sacamos para que los vacíen	Permanentemente en la calle
Resto (gris)	○	○
Papel y cartón (azul)	○	○

15 ¿Cómo gestionan los residuos de palets y plásticos film generados?

Por favor, marque las opciones que correspondan:

- ☐ Mediante la extranet para solicitar que se los retiren
- ☐ Mediante llamada a un gestor autorizado
- ☐ Se deposita dentro o junto al contenedor más cercano
- ☐ Otro:

16 ¿Disponen de un sistema de recogida selectiva para los residuos orgánicos en el comedor?
Sólo conteste esta pregunta si se cumplen las siguientes condiciones:
La respuesta fue 'Sí' en la pregunta '9 [q16]' (¿Dispone su empresa de un comedor?)

Por favor seleccione sólo una de las siguientes opciones:

- ○ Sí
- ○ No

17 ¿A quién da aviso de incidencias relacionadas con los contenedores (contenedor roto, desaparecido, sin vaciar, solicitud de un nuevo contenedor, consultar frecuencias de recogidas, etc?

Por favor, marque las opciones que correspondan:

- ☐ A la Mancomunidad
- ☐ Al Ayuntamiento
- ☐ Llamo al Teléfono 946569900
- ☐ No doy avisos
- ☐ NS/NC
- ☐ Otro:

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Fiscalidad e introducción de tecnología

18 ¿Considera que todas las empresas deben pagar la misma tasa de basura o que se debe aplicar una tasa diferenciada?

Por favor seleccione sólo una de las siguientes opciones:

- ◯ Sí, todas las empresas deben pagar lo mismo
- ◯ No, se debe aplicar una tasa diferenciada

19 ¿Qué variable o variables considera que deben tenerse en cuenta a la hora de pagar la tasa de basuras?

Sólo conteste esta pregunta si se cumplen las siguientes condiciones:
La respuesta fue 'No, se debe aplicar una tasa diferenciada' en la pregunta '18 [q21]' (¿Considera que todas las empresas deben pagar la misma tasa de basura o que se debe aplicar una tasa diferenciada?)

Por favor, marque las opciones que correspondan:

- ☐ Cantidad de residuos generados
- ☐ Superficie de la empresa
- ☐ Número de trabajadores de la empresa
- ☐ Tipo de actividad
- ☐ Otro:

20 ¿Cree que los contenedores (de RSU y papel/cartón) deben estar identificados y asociados cada uno de ellos a una única empresa?

Por favor seleccione sólo una de las siguientes opciones:

- ◯ Sí
- ◯ No

21 Considera que dotar a los contenedores de un sistema de apertura mediante tarjeta electrónica identificativa sería útil para ...

Por favor, marque las opciones que correspondan:

- ☐ Reducir la presencia de residuos impropios (residuos que deberían haberse depositado en otro contenedor)
- ☐ Aumentar el nivel de recogida separada
- ☐ Determinar la tasa de basuras según la generación de cada empresa
- ☐ Otro:

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Satisfacción y mejora del servicio

22 ¿Conoce la existencia de la ordenanza reguladora del servicio de recogida de residuos en polígonos industriales, empresariales y parques tecnológicos de los municipios que integran la Mancomunidad del Txorierri?

Por favor seleccione sólo una de las siguientes opciones:

- ○ Sí
- ○ No

23 ¿Que podríamos hacer para facilitarles una mayor recogida selectiva de residuos asimilables a domésticos, esto es, los no generados directamente por su actividad industrial?

Por favor, marque las opciones que correspondan:

- ☐ Poner más contenedores
- ☐ Acercar los contenedores a su empresa
- ☐ Cambiar la frecuencia de recogida de las fracciones selectivas
- ☐ Otro:

24 Indique su nivel de satisfacción con los siguientes aspectos del servicio de recogida de residuos. (muy poco satisfecho, 5 muy satisfecho)

Por favor, seleccione la respuesta apropiada para cada concepto:

	1	2	3	4	5
Limpieza y mantenimiento de los contenedores	○	○	○	○	○
Frecuencia de recogida	○	○	○	○	○
Números de contenedores	○	○	○	○	○
Cercanía a su hogar	○	○	○	○	○
Fracciones que se recogen	○	○	○	○	○

25 Este es su espacio para dejar sugerencias sobre cómo mejorar el sistema de recogida de residuos

Por favor, escriba su respuesta aquí:

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Participación activa

26 ¿Le gustaría recibir información sobreel proyecto Waste4Think?

Por favor seleccione sólo una de las siguientes opciones:

- ◯ Sí
- ◯ No

27

Política de Protección de Datos de Carácter Personal

Si estás interesado en participar activamente en un grupo de trabajo para mejorar la gestión de residuos en Zamudio, puede dejarnos su dirección de correo electrónico. En caso de que lo haga, y en cumplimiento de la Ley Orgánica 15/1999, de 13 de diciembre, sobre protección de Datos de Carácter Personal (LOPD) desde el ayuntamiento de Zamudio le informamos de que, en virtud de lo establecido en la Ley 34/2002, de 11 de julio, de Servicios de la Sociedad de la Información y de Comercio Electrónico, el ayuntamiento de Zamudio podrá utilizar las direcciones de correo electrónico facilitadas por usted exclusivamente para facilitarle información relativa al proyecto Waste4think. Usted da su consentimiento expreso para que el ayuntamiento de Zamudio pueda utilizar su dirección de correo electrónico con este fin concreto.
Usted podrá, en todo momento, ejercitar los derechos reconocidos en la LOPD, de acceso, rectificación, cancelación y oposición. El ejercicio de estos derechos puede realizarlo el propio usuario mediante correo electrónico enviado a: udala@zamudiokoudala.net
*

Sólo conteste esta pregunta si se cumplen las siguientes condiciones:
La respuesta fue 'Sí' en la pregunta '26 [q123]' (¿Le gustaría recibir información sobreel proyecto Waste4Think?)

Por favor seleccione sólo una de las siguientes opciones:

- ◯ Sí
- ◯ No

28 Datos de contacto

Sólo conteste esta pregunta si se cumplen las siguientes condiciones:
La respuesta fue 'Sí' en la pregunta '27 [q1234]' (Política de Protección de Datos de Carácter Personal Si estás interesado en participar activamente en un grupo de trabajo para mejorar la gestión de residuos en Zamudio, puede dejarnos su dirección de correo electrónico. En caso de que lo haga, y en cumplimiento de la Ley Orgánica 15/1999, de 13 de diciembre, sobre protección de Datos de Carácter Personal (LOPD) desde el ayuntamiento de Zamudio le informamos de que, en virtud de lo establecido en la Ley 34/2002, de 11 de julio, de Servicios de la Sociedad de la Información y de Comercio Electrónico, el ayuntamiento de Zamudio podrá utilizar las direcciones de correo electrónico facilitadas por usted exclusivamente para facilitarle información relativa al proyecto Waste4think. Usted da su consentimiento expreso para que el ayuntamiento de Zamudio pueda utilizar su dirección de correo electrónico con este fin concreto. Usted podrá, en todo momento, ejercitar los derechos reconocidos en la LOPD, de acceso, rectificación, cancelación y oposición. El ejercicio de estos derechos puede realizarlo el propio usuario mediante correo electrónico enviado a: udala@zamudiokoudala.net)

Nombre

Email

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Enviar su encuesta.
Gracias por completar esta encuesta.

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Survey conducted in OCT/NOV 2017to calculate the "baseline" (behaviours on prevention and recycling after developing the main project actions) (see related KPI in the table SA_R17>Rate of HH saying that they have changed their habits after Waste 4 Think activities in the Quantitative Monitoring FORM)

1.4. Prevención de residuos

Metodología

La METODOLOGÍA que se ha empleado para la elaboración en esta investigación es de tipo cuantitativa, mediante la técnica de entrevista telefónica.

Esta técnica de investigación posibilita responder a la totalidad de los objetivos propuestos obteniendo unos resultados de máxima validez y fiabilidad con los que, consecuentemente, poder actuar con eficacia.

La población que integra el UNIVERSO DE ESTUDIO es la compuesta por el conjunto de personas mayores o igual a 18 años, residentes en ZAMUDIO realizándose el trabajo de campo durante el mes de OCTUBRE y NOVIEMBRE de 2017.

Se ha realizado un MUESTREO estratificado, con fijación proporcional a las cuotas, utilizando igualmente metodología cuantitativa.

Ficha técnica

MUESTRA:

350 personas residentes en ZAMUDIO.

Em=±4,87%, nivel de confianza del 95%, p=q=0´5, para datos totales.

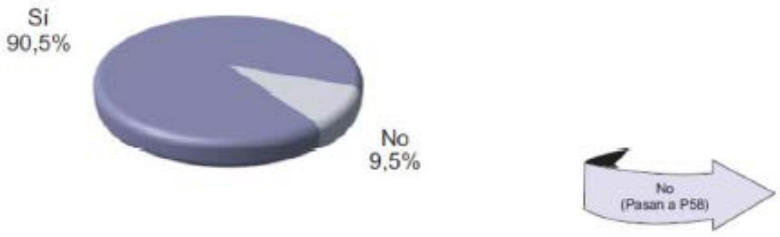
El 15,3% de las encuestas han sido realizadas en euskera y el 84,7% restantes en castellano.

Muestra aleatoria estratificada por sexo y edad. Datos ponderados por edad.

TRABAJO DE CAMPO:

El trabajo de campo se realizó durante los días del 19 de octubre al 7 de noviembre de 2017, mediante entrevista telefónica.

Lleva a cabo alguna actividad de prevención de residuos



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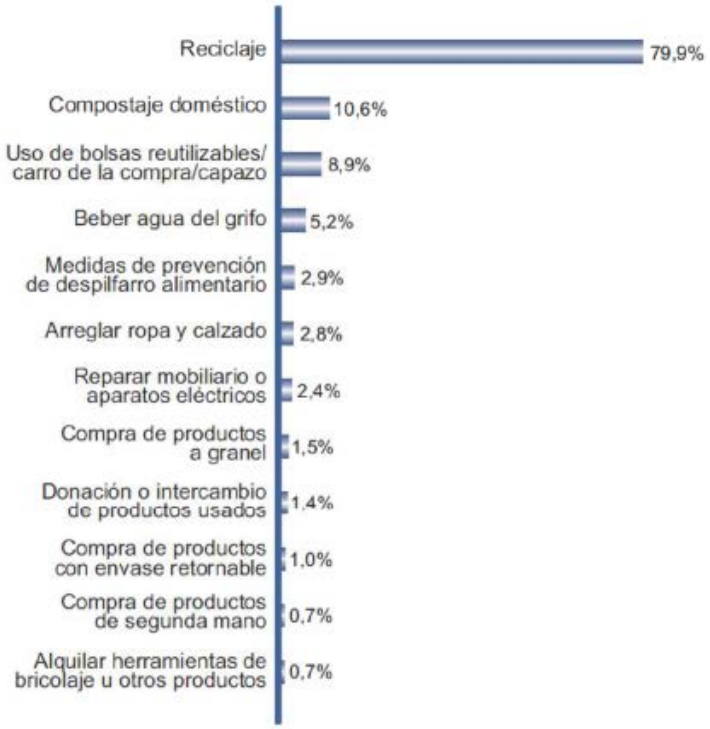
Actividades de prevención de residuos que lleva a cabo normalmente

Respuesta espontánea



% de respuestas afirmativas

Conoce algún tipo de actuación de prevención de residuos

n=No llevan a cabo actividades de prevención de residuos

9,5%

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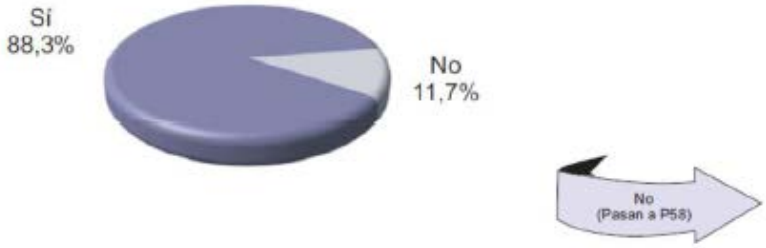
Actividades de prevención de residuos que conocen

n=No llevan a cabo actividades de prevención de residuos
9,5%

Respuesta espontánea

% de respuestas afirmativas

Separan los residuos en casa



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Tipo de residuos que separa en casa

% de respuestas afirmativas

Frecuencia con la que separa cada tipo de residuo

	Frecuencia						
	Diariamente	2-3 veces/ semana	1 vez/ semana	Mensualm.	Otras	Nunca	Ns/Nc
"Papel-cartón"	32,2%	23,9%	25,1%	0,7%	2,8%	12,6%	2,7%
"Plásticos"	33,9%	29,9%	18,1%	0,7%	1,9%	12,7%	2,8%
"Envases"	36,1%	28,4%	15,9%	0,0%	2,2%	14,6%	2,8%
"Vidrio"	26,1%	13,3%	24,6%	6,1%	8,3%	17,1%	4,5%
"Pilas"	2,0%	0,2%	3,1%	10,6%	51,6%	23,7%	8,8%
"Textil y zapatos"	1,0%	0,4%	0,5%	3,0%	55,8%	34,7%	4,6%
"Aceites de cocina"	8,3%	3,2%	8,5%	17,1%	20,6%	37,6%	4,7%
"Aparatos eléctricos y electrónicos"	0,7%	0,2%	0,2%	1,7%	52,9%	38,8%	5,5%
"Resto de materia orgánica"	23,3%	20,1%	10,1%	0,5%	1,7%	41,3%	3,0%
"Materia orgánica vegetal sin aceite"	24,5%	12,7%	7,3%	2,4%	3,3%	46,7%	3,1%
"Residuos voluminosos"	1,7%	1,1%	1,0%	1,6%	39,1%	50,0%	5,5%
"Residuos vegetales"	2,4%	2,7%	2,1%	2,0%	11,3%	77,7%	1,8%
"Productos peligrosos"	0,2%	0,2%	0,0%	0,2%	17,1%	78,5%	3,8%

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Final survey

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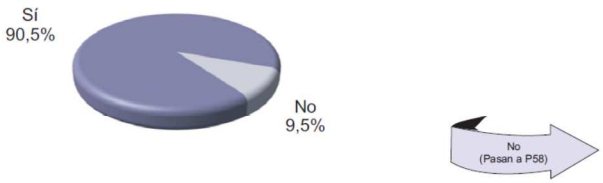
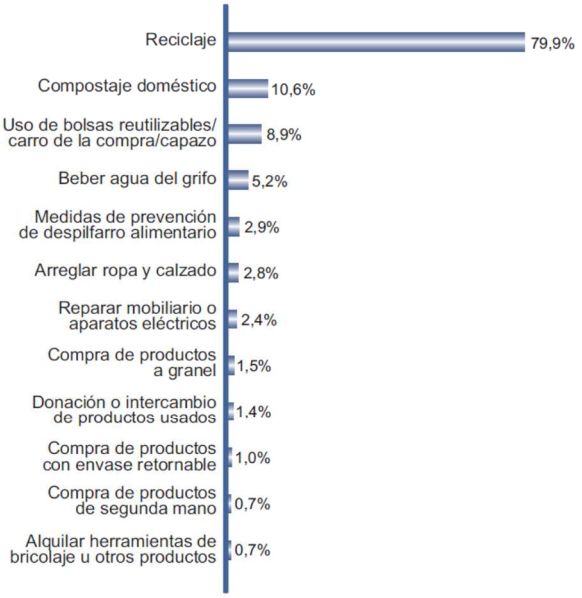


Actividades de prevención de residuos que lleva a cabo normalmente

Respuesta espontánea



% de respuestas afirmativas

Conoce algún tipo de actuación de prevención de residuos

n=No llevan a cabo actividades de prevención de residuos
9,5%

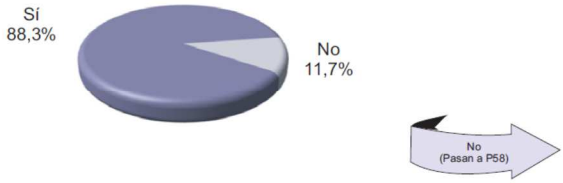
Actividades de prevención de residuos que conocen

Respuesta espontánea

n=No llevan a cabo actividades de prevención de residuos
9,5%

% de respuestas afirmativas

Separan los residuos en casa



Tipo de residuos que separa en casa

% de respuestas afirmativas

Frecuencia con la que separa cada tipo de residuo

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"Productos peligrosos"	0,2%	0,2%	0,0%	0,2%	17,1%	78,5%	3,8%

Motivo por el que no separan residuos en casa

n=No separan residuos en casa
11,7%

Respuesta espontánea

1. Do you follow any prevention activity?

YES	90,50%
NO	9,50%

If yes

1.1 Which kind of waste prevention activity?

Recycling	79,9%
Home composting	10,6%
Reusable bags	8,9%
Tap watter	5,2%
Reduce avoidable foodwaste	2,9%
Repair clothes and shoes	2,8%
Repair furnitures, electronic devices	2,4%
Buy in bulky	1,5%
Donate, exchange goods	1,4%
Buy refillable bottles	1,0%
Buy 2nd hand goods	0,7%
Hire goods	0,7%

If no

1.2 Do you know any prevention activity?

YES	55%
No	45%

1.2.1 If yes, which one?

Recycling	48%
Repair clothes&shoes	21%
Food wastage	18%
Home composting	15%

2. Do you do separate collection at home?

YES	88,30%
NO	11,70%

If yes

2,1 Waste streams separated

PC	87,4%
Plastic	87,3%
Packaging	85,4%
Glass	82,9%
Batteries	76,3%
Textile	65,3%
Domestic oil	62,4%
WEE	61,2%
Foodwaste	58,7%
Bulky	50,0%
Prunning	22,3%
Biowaste without oil	53,3%
Hazardous	21,5%
Other	0,04%

Frecuencies in the appendix

If no

2.2 Can you explain why?

I don't have space at home	18,1%
I don't have a kitt at home	16,1%
Containers are not near	5,4%
I don't know how to do it correctly	2,7%
It's not mandatory	2,1%
no answer...	55,6%

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Annex 13 Social ActionPlan Implementation

1.1 Social Action Plan implementation SEVESO

1.1.1 SE 1 Citizens sensitization

NAME OF THE ACTION: SE1.1 Dinner with waste STRATEGIC LINE RELATED: SE 1
Location: On the street / indoor in some public spaces.
Success of the action (0-5): 4
Waste streams: All
Waste management stages: Prevention, Separate collection
Period of the implementation: M12-M17
Short description: Self-organized dinner; particpants bringing food and tableware to share. Sorting game performed and facilitators explaining.
Current status (finished, onwards..): ongoing.
Communication tools (main media used etc.): Leaflet, “social street” approach.
Training tools: Stand with roll up. Sorting game, Questionnaire to check the attitude about separate collection and prevention. Sample of bags and containers
Other tools developed during the campaign (financial, local , ordinance
Target group and N. of stakeholders involved (expected and effective): Target: citizens (families). Expected: 110 effective: 90
Rate of participation (% or number): 81% (people participating/ invited)
Key points of success: Conviviality and user-friendliness.
Description of the monitoring methodology, if any (surveys, waste weighting,etc.). Link to the Social KPI.
Qualitative social economical impact / benefit:
Costs detailed? If yes, details, possibly also normalized (per citizen, per ton…): staff: About 30 man/hours covered by W4T.
Add some pictures of the activity:

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Links to press releases, etc.: see Redbooth WP4
Lessons learnt: Delivery of environmental messages in a friendly setup is easier and participation is higher.
Other interesting information:

NAME OF THE ACTION: SE1.5 Sensitization in summer camps in parishes STRATEGIC LINE RELATED: SE 1
Location: 4 Parishes of Seveso
Success of the action (0-5): 2
Waste streams: Recyclables
Waste management stages: Separate collection
Period of the implementation: summer 2017
Short description: A sorting game "where should I throw this" has been done with children and educators. This was done in 2 rounds: at the beginning and in the end of the camp.
Current status (finished, onwards..): finished. To be reviewed for next year due to low success.
Communication tools (main media used etc.): Preliminary meetings with educators, phone calls
Training tools: facilitators using a game simulating domestic separation of waste
Other tools developed during the campaign (financial, local , ordinance...): //
Target group and N. of stakeholders involved (expected and effective): Target: children and educators. Expected: 700, effective: 700
Rate of participation (% or number): 60% (in the second round, 300 children didn't participate because educators said it was too hot)
Key points of success: all 4 parishes agreed to do the activity. High interest by adult referents, all children participated
Description of the monitoring methodology, if any (surveys, waste weighting, ...). Link to the Social KPI. Percentage of right answers to the game.
Qualitative social economical impact / benefit: children are supposed to influence behavior in their families. This issue have been proposed for the first time in summer camps.
Costs detailed? If yes, details, possibly also normalized (per citizen, per ton…): staff: 50 man/hours for preparation and implantation, covered by W4T,.
Add some pictures of the activity:

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Links to press releases, etc.: see Redbooth WP4

Lessons learnt: the results show that on average no one improved his behavior after one month. This activity should be reconsidered for next year.

Other interesting information: 2 boys of the "school / work alternance" project helped with the activity.

NAME OF THE ACTION: SE1.2 Sensitization in public spaces STRATEGIC LINE RELATED: SE 1
Location: Markets, Municipal hall, bag dispensers, public events.
Success of the action (0-5): 4
Waste streams: All
Waste management stages: Prevention, Separate collection
Period of the implementation: M12-M17
Short description: Facilitators in a stand,
Current status (finished, onwards..): ongoing.
Communication tools (main media used etc.): Web site of the municipality, local newspapers, social network.
Training tools: Stand with roll up and info leaflets. In some events music and street theatre. Questionnaire to check the attitude about separate collection and prevention. Sample of bags and containers
Other tools developed during the campaign (financial, local , ordinance…): Official letter of the municipality explaining PAYT, other information.
Target group and N. of stakeholders involved (expected and effective): Target: citizens. Expected: //, effective: 1900 passing by, 200 stopped to ask for information.
Rate of participation (% or number): 11% (people stopping/people passing by)
Key points of success: Effective support "on the road" to the ecology office, direct contact with citizens, accelerated the improvement of the waste collection and PAYT service.
Description of the monitoring methodology, if any (surveys, waste weighting, …). Link to the Social KPI. By now, estimation according to the satisfaction after receiving support.
Qualitative social economical impact / benefit:
Costs detailed? If yes, details, possibly also normalized (per citizen, per ton…): staff: This activity

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supported the ecology office with an activity spread all around the city. About 100 man/hours covered by W4T.
Add some pictures of the activity:
Links to press releases, etc.: see Redbooth WP4
Lessons learnt: Listening to citizen's need face to face allowed to accelerate some improvements (e.g. the introduction of the free orange bag for nappies was anticipated to august 2017 following the high request by citizens).
Other interesting information:

6.1.1.1 SE3 Ecoevents

NAME OF THE ACTION: Sagra Valtellinese Eco-event STRATEGIC LINE RELATED: SE3 Ecoevents
Location: Public covered space for municipal event (Street Redipuglia, Seveso)

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Success of the action (0-5): 4
Waste streams: municipal waste (organic, light packaging, card and cardboard, cooking oil, residual waste)
Waste management stages: Prevention and separate collection
Period of the implementation: 31 August 2017
Short description: Organization of the first eco-event during the four-day long Valtellinese Festival. People was served with washable dishes and cutlery and was informed about environmental benefits of an eco-event and sensitized on separate collection and waste production. This was only the first trial event for Seveso Municipality that during the summer season hosts many events. The aim for the next year is to spread the good practice experimented to a more number of events, sensitizing a great number of people of Seveso and surrounding municipalities.
Current status (finished, onwards..) Finished for the summer season 2017, to be improved for the next summer seasons (2018-2021) involving more associations and volunteers.
Communication tools (main media used etc.) Municipal website, paper advertisement (placemat), twitter and facebook, local (web)newspapers
Training tools Some times before the event, the organizing association has been trained an how to organize an eco-event by ARS. Just before the event, all the volunteers involved in the event management have been trained on separate collection by ARS and SEVESO municipality.
Other tools developed during the campaign (financial, local, ordinance...) No other tools developed
Target group and N. of stakeholders involved (expected and effective) Associations organizing events (10 more or less), One association (ASD - Associazione Sportiva Dilettantistica of Seveso) decided to organize an Eco-event with 20-30 volunteers. Seveso and neighboring municipalities' citizens (not quantified), all of them could participate, before enrollment.
Rate of participation (% or number) 600 people participated
Key points of success Good commitment of organizing association, volunteers training, presence of public authority (Seveso's Major), sensitization action in support by Legambiente.
Description of the monitoring methodology, if any (surveys, waste weighting ...). Link to the Social KPI. For all the events organized in the months of August and September 2017 in Seveso, ARS with the collaboration of the municipality set up a monitoring system based on a detailed reporting on: number of participants (KPI), waste management (separate collection, frequent mistakes, etc.) and waste weighing, allowing to calculate the rate of selective collection reached in each event (KPI). Especially for the Eco-event and for the day-after non Eco-event it was conducted a social survey with the means of a "smile-totem" in order to collect the participants' feelings (social acceptance – KPI).
Qualitative social economical impact / benefit To test the satisfaction of the participants a "smile" totem was in place in order to collect their first feeling about the event. The feedback was extremely positive for the 80% of them. The economic impact was also positive because association organizing the event saved money for: better management of waste (only 3 kg of cutlery lost compared to the 12 kg of the previous edition), avoided disposable cutlery and dishes, better comfort of participants with a greater success.
Costs detailed? If yes, details, possibly also normalized (per citizen, per ton...) Municipal expenditures: € 12.746,38 (dishwasher, closet, washable dishes, waste area assistance during the events, communication, placemats) Association expenditures for the first season 2017: € 2.150 (washable dishes and cutlery, dishsoap) Total: 14.896 €, Normalized: 22,9 €/meal Savings thanks to avoided purchase of disposable cutlery and dishes (estimated): 4.600 €, Normalized: 7,1 9 €/meal
Add some pictures of the activity

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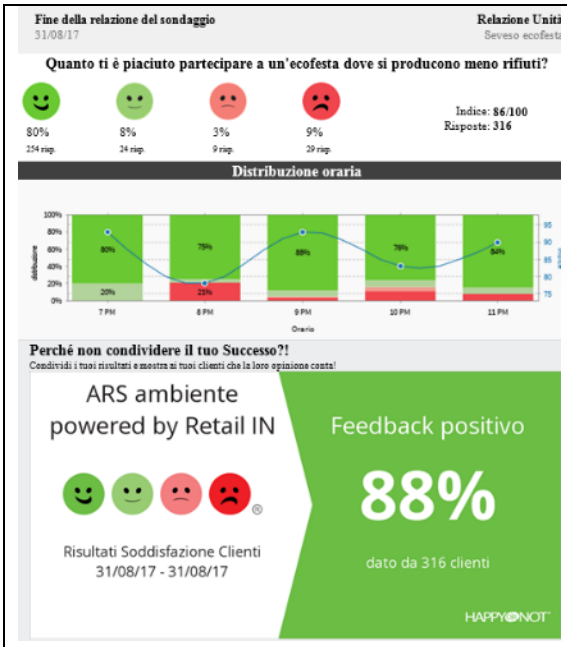

Links to press releases, etc.
https://www.mbnews.it/2017/09/a-seveso-la-prima-ecofesta-che-diminuisce-e-differenzia-i-rifiuti/
https://www.facebook.com/Comune-di-Seveso-Ambiente-Ecologia-e-Lavori-Pubblici-162413709450785 5/?hc_ref=ARRkpMXI4uP24ozYrONVXs8uITilGeYE94qw1m59FAT6qCIcMddw4y8fFO1-8IBTpOk&fref=nf
http://www.arsambiente.it/tag/waste4think/
http://waste4think.eu/first-eco-event-seveso
Full press review: https://drive.google.com/open?id=0B6d3Dk1beR1WM3hEOHNsYmZNRFk

Lessons learnt Associations organizing eco-events, especially for the first time, have to be adequately trained and motivated. Even if they could raise some doubts or see only obstacles, the good results of the event, also in terms of economic and social benefits, will satisfy them. In addition, participants have to be sensitized especially on the environmental meaning of the event, in order to let them to change their habits also at home.

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Other interesting information Not only during the Eco-event, but also during the non Eco-events monitored has been reported a high rate of separate collection, probably due to the presence of a person giving instruction to them and weighing waste. It's also interesting to monitor not only the separate collection rate but also the light packaging per capita as an indicator of less production of plastics related to avoided disposable dishes and cutlery.

6.1.1.2 SE4 PAYT

NAME OF THE ACTION: Implementation of the PAYT system STRATEGIC LINE RELATED: SE4 PAYT
Location: SEVESO
Success of the action (0-5):
Waste streams: ALL urban waste
Waste management stages: PREVENTION, COLLECTION
Period of the implementation: START May 2017
Short description: After the approval of the local regulation by the City Council, starting from 1° May 17, the blue bags with RFID started to be counted in order to introduce PAYT in Seveso. The payment of the collecting waste fee has been divided in two parts: a fixed fee, payed in May (90% of the total amount), and a variable fee in November, calculated for each user on the basis of the number of bags collected by Gelsia Ambiente from May to October. In this way, the cost of each bag is equal to 2,30 €. The fixed part of the invoice sent to all the users, contained also an official letter, informing the citizens about the new way of charging the waste tax. Furthermore, the citizen have been informed during an evening public meeting (12th of April 2017), through social network and websites (official Seveso Municipality website and Facebook pages). Media have been informed through a press-conference on the same day of the public event (12th of April 2017). They wrote some news in their newspaper in the following days. Furthermore, an official letter has been sent in October 2017 to the zero-waste users (almost 2.000). They're users that didn't deliver any blue bag during the year. The zero-waste users have to justify the zero-waste production to the municipality, otherwise they will be charged with a rate, based on the average blue bag collection. It's necessary to fight against the phenomenon of zero-waste production, because frequently it hides illegal behaviors (i.e. illegal waste dumping, not proper use of ibags, etc.). Citizens can take blue bags with RFID and yellow bags for plastic waste and bins 7 days a week at the "Oak Forest Park" ("Bosco delle Querce" the park created after the Seveso 1976 accident) and at Town Hall, only with user's identification card.
Current status (finished, onwards..) ONWARDS
Communication tools (main media used etc.) Letter to all households: 9.000 Letter to zero-waste users: almost 2.000 Open public meeting for citizens Press conference for media Websites (Municipal and W4T websites) Social media (facebook, twitter) Press release and newspaper Funny Door to door campaign (see also SE1)
Training tools Public officers, working in Seveso Municipality, have been informed and trained by ARS and Softline people about PAYT, and its technical features in order to be able to answer to citizens complaints and questions. The draft of the regulation has been carefully explained to members of municipal council by ARS people in

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order to let them understand its main contents.

Other tools developed during the campaign (financial, local ordinance…)

The main tool developed during the action is the new Regulation on PAYT approved on the 30th of March 2017 by Municipal Council (available on Municipal website).

More recently, in August 2017, the Municipality, together with GELSIA, the waste management company, introduced the orange bag for families with newborns or invalid or ill people needing diapers. The orange bag is collected in the same days of the blue one but does not enter in the calculation of the variable part of the waste tax.

Furthermore is provided for the next months the introduction by Softline of a citizens' app linked to the municipal database allowing citizens to know more about separate collection (day of collections, ways to sort, etc.) and to be daily updated on their waste production.

Target group and N. of stakeholders involved (expected and effective)

Target group are all the domestic and non-domestic users in Seveso Municipality (about 9.000). All of them are involved in the PAYT introduction, even if they are zero-waste generators (see above).

Rate of participation (% or number)

- The participation in PAYT is 100% of the Seveso users.
- Zero-waste users are almost 2.000, slowly diminishing over the time: they were reached by a specific letter and in the future with specific actions, to be established.
- Citizens participating in the public meeting were about 100.
- For citizens involved in Funny door-to-door sensitization, please see SE1.

Key points of success

Seveso has successfully introduced the PAYT thanks to the introduction, some years ago, of the ibag. The experimentation with ibag before the tax is a key element because: citizens could gradually change their habits and understand the meaning of less waste production and how to sort correctly their waste; and the waste management company together with the municipality can solve the technical issues related to technological aspects (malfunction of RFID or sensors, wrong assignment of the bag to the user, etc.) before the introduction of the new charging system.

The sensitization activities have a key role to help all the targets involved in understand the change.

Furthermore the political commitment has been necessary to approve the new regulation, despite internal oppositions.

Description of the monitoring methodology, if any (surveys, waste weighting, …). Link to the Social KPI.

Data on waste collection (separate collection rate, weight of all the fractions, number of basg, zero-waste producers, etc.) and PAYT payments are regularly collected by municipality and waste management company in their databases. This data are available for W4T monitoring.

A first questionnaire has been submitted to a group of citizens (about 100) in summer 2017, in order to verify their social acceptance of the new tax.

Some quantitative indicators have been identified and described by a specific methodology to monitor the success of this action:

All of them are easy to be calculate with available data.

Those ones regarding social acceptance could be estimated through specific questionnaire. The purpose is to repeat the questionnaire periodically (each year) in order to verify the social acceptance from a high number of citizens.

The main result highlights how monitoring and PAYT systems can foster habits in habitants to separate collection and prevention. From typical DtD to Monitor use of the system by the citizens, the municipality grew from 65% to 77% separate collection. Thanks to PAYT, the separate collection rate has increased to 82% (June 2017).

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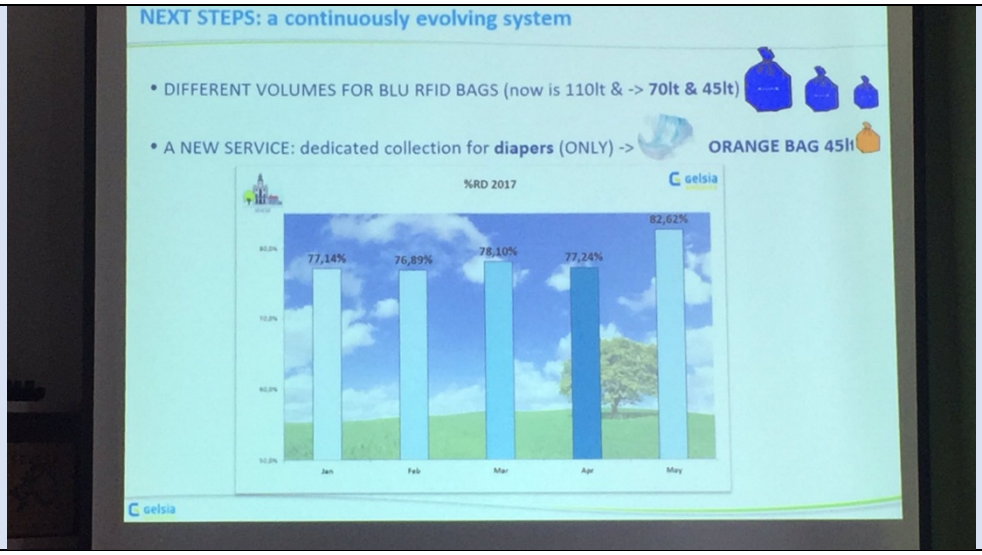

Qualitative social economical impact / benefit

PAYT is a more equal system to charge citizens on the bases of their real behavior in waste production and sorting. So, it's a way to introduce equity.

The economic impact is consequent and could be positive if the user is committed to produce less waste, also changing its purchasing habits, or negative if the user produces more unsorted waste than the average.

The economic impact could be positive also for the municipality that could have significant global savings thank to the less waste dumping and more incomes from separated fractions.

Another economic and social impact comes from the environmental impact avoided thank to the less production of waste, because it contributes in well-being and economic savings.

Costs detailed? If yes, details, possibly also normalized (per citizen, per ton…)

- 1.000 € for letter to citizens (+ 4.000 € already covered by the tax)
- 1.500 € for letter to zero waste users
- 15.000 €/year for double invoicing

Other expenditures are already covered by the service charge due to the waste management company (GELSIA), by the W4T funding and by the tax payed by citizens (e.g. 60.000 €/year for blue bags with RFID are already covered).

Add some pictures of the activity

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Links to press releases, etc.

http://www.ilcittadinomb.it/stories/Cronaca/seveso-spiega-la-rivoluzione-dei-rifiuti-arriva-il-sacco-blu_1233191_11/

http://www.comune.seveso.mi.it/pubblicazioni/Informazioni/Informazioni.asp?ID_M=378

http://waste4think.eu/rfid-payt-seveso

https://www.gelsia.it/libera-luce/un-sacco-giusto-caso-seveso-0239650.html

https://robertofumagalli.wordpress.com/2017/05/21/sacco-blu-con-microchip-come-e-cambiata-la-raccolta-differenziata-a-seveso-mb/

http://www.arsambiente.it/tag/waste4think/

All the press release are available here:

https://drive.google.com/open?id=0BxlcbuVwPPHjXy1uVDBMQlhJZlE

https://drive.google.com/open?id=0B_ozNz3aO9aHcGhiSWlNTF9yd1U

Lessons learnt

To be successful is needed:

- Political commitment
- Officers' training
- Sensitization actions tailored to the specific targets involved
- Specific treatments for special needs (e.g. diapers, etc.)
- Illegal behaviors controls

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Other interesting information
The sensitization activity toward citizens will continue over the time and some adjustments of the PAYT regulation could be possible in the next year.

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1.2 Social Action Plan Implementation Zamudio

6.1.1.1 Z2 Schools Campaign and activities

NAME OF THE ACTION: Candle workshop in Zamudio Public School STRATEGIC LINE RELATED:
Location:Zamudio Public School
Success of the action (0-5):4,5
Waste streams: All
Waste management stages: ??
Period of the implementation: 17-24 November, 2017
Short description: The workshop it done with the students of 3-12 years, once to each class. At the beginning of the workshop a small presentation is made to raise awareness of the problem that involves pouring the oil through the sink. The students brought used cooking oil from home and with that oil the candles were made. For the rest of material, was used the one that was purchased from the Portuguese company Greatest candle in the world. Each student was also given a kit with the necessary material to make another 5 candles at home with instructions in Spanish and Basque. The objective of this workshop is to raise awareness of the problem of oil and teach a way to reuse the oil.
Current status (finished, onwards..): Finished.
Communication tools (main media used etc.): Directly at school, with the director.
Training tools: No
Other tools developed during the campaign (financial, local , ordinance...): They are also distributing kits to make candles in the town hall to any citizen who wants it. ZamudiOrain October.
Target group and N. of stakeholders involved (expected and effective): School students and teachers.
Rate of participation (% or number): 260 students and teachers.
Key points of success Children like to do new and creative things. Children absorb a lot of information and then pass it on to family members.
Description of the monitoring methodology, if any (surveys, waste weighting, ...). Link to the Social KPI. After the workshop the teachers filled in a satisfaction survey.
Qualitative social economical impact / benefit: The oil is not poured through the sink and thus does not harm the sanitation and facilitates the purification of water.
Costs detailed? If yes, details, possibly also normalized (per citizen, per ton...)
Add some pictures of the activityWhere in the folder
Links to press releases, etc.ZamudiOrain: October
Lessons learnt: The workshop is a little bit dangerous to do with the youngest students.
Other interesting information

6.1.1.2 Z6 PAYT

NAME OF THE ACTION: CITIZE PARTICIPATION STRATEGIC LINE RELATED: PAYT
Location: Zamudio Public School
Success of the action (0-5): 4,2
Waste streams: All
Waste management stages:
Period of the implementation: February 2017 – December 2018

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Short description: During this first participation meeting, we discuss about the new collection and monitoring system. During the first 15-20 minutes, the major explained the novelties of the new collection system. The first dynamic was about the redaction of what citizens would want to read about Zamudio's recycling rates some years after the project. After that, we divide citizens into 3 groups. In those small groups, they should find what are the new collection system troubles, and who they would solve them. Finally, they got together, and they shared each group conclusions.
Current status (finished, onwards..) Onwards: second meeting will be on 25th October.
Communication tools (main media used etc.) ZamudiOrain local magazine, calls/personal mailing to people who want to participate.
Training tools ¿?? Shadow invoicing (last trimester of 2018)
Other tools developed during the campaign (financial, local , ordinance...) PAYT fiscal ordinance
Target group and N. of stakeholders involved (expected and effective) Zamudio citizens, other Txorierri's municipalities citizens and local traders
Rate of participation (% or number) 12 people
Key points of success We hire a participation enterprise in order to make a more productive meeting. They prepare 2 dynamics, which were effective to let people participate. Week day and hour was good.
Description of the monitoring methodology, if any (surveys, waste weighting, ...). Link to the Social KPI. After conclusions, the enterprise delivered to each citizen a survey asking about dynamic drivers, the workshop, the place and used materials.
Qualitative social economical impact / benefit We will know during Aranoltza's pilot, shadow invoicing and PAYT implementation.
Costs detailed? If yes, details, possibly also normalized (per citizen, per ton...) Hired enterprise -> 3 participation meetings Maps -> 28-29 €
Add some pictures of the activity are in the folder
Links to press releases, etc. ZamudiOrain: May-June-October
Lessons learnt In order to reach to more citizens, we will need to use public communication tools. It is important to have better rates of participation in the next meeting, where we are going to start with PAYT scheme.
Other interesting information

NAME OF THE ACTION: CITIZE PARTICIPATION STRATEGIC LINE RELATED: PAYT
Location: Zamudio Public School
Success of the action (0-5): 4,1
Waste streams: All

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Waste management stages: PAYT scheme
Period of the implementation: February 2017 – December 2018
Short description: We discussed about the PAYT scheme. The major explained for 40 minutes what is the PAYT, which constraints it has and how we want to implement in Zamudio. After that, we proposed some question to argue in small groups, doing a role-play. Questions to answer were: - How many bags of solid waste do you think you generate per week? - Do you know how much you pay for garbage tax? Is there any variable? - How much would be the variability that you would understand as appropriate to get a change on that people who do not recycling? - 50 €. Is it enough? - If you think it's enough, do you think it should be decreased? - If you think that is not enough, in what way should we improve the rate of - recycling? - How many openings should be assumed in the fixed part? - What is more effective: receive a bonus or pay less? First group must answer questions as if they had a local trade in Zamudio, second group should to answer as if they were elder people, and the last one, as if they were a large family. This role-play went on for 30 minutes. Finally, they got together again, and they shared each group conclusions.
Current status (finished, onwards..) Onwards: we will present them a PAYT proposal to validate it.
Communication tools (main media used etc.) ZamudiOrain local magazine, AdiZamudio App, poster in the streets, calls/mailing to people who want to participate.
Training tools Shadow invoicing (last trimester of 2018)
Other tools developed during the campaign (financial, local , ordinance...) PAYT fiscal ordinance
Target group and N. of stakeholders involved (expected and effective) Zamudio citizens, other Txorierri's municipalities citizens and local traders
Rate of participation (% or number) 13 people
Key points of success We hire a participation enterprise in order to make a more productive meeting. They prepare 2 dynamics, which were effective to let people participate. Week day and hour was good, despite of the people who have a local trade. Knowing that, we will call them to participate in enterprises participation process.
Description of the monitoring methodology, if any (surveys, waste weighting, ...). Link to the Social KPI. After conclusions, the participation enterprise delivered to each citizen a survey asking about dynamic drivers, the workshop, the place and used materials.
Qualitative social economical impact / benefit We will know during Aranoltza pilot, shadow invoicing and PAYT implementation.
Costs detailed? If yes, details, possibly also normalized (per citizen, per ton...) Hired enterprise -> 3 participation meetings
Add some pictures of the activity are in the folder
Links to press releases, etc. ZamudiOrain: October
Lessons learnt Despite of the efforts made to foster people to participate in the participation meeting using all public communication tools available, we have the same success rate.
Other interesting information

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6.1.1.3 Z7 ZERO ECOEVENTS

NAME OF THE ACTION: V. ZAMUDIO'S CHOCOLATE, SWEET AND CRAFT FAIR AND XXV. BASQUE COUNTRY LIMOUSINE BREED CHAMPIONSHIP STRATEGIC LINE RELATED: ECOEVENT
Location: Parking of Avenida Pinoa
Success of the action (0-5):
Waste streams: For the drinks it use PLA compostable glasses and for the food were used compostable plates. It wanted to be thrown the cups in the organic (brown) bin (that was opened) to make compost. But people are not aware and for this reason people throw the waste to the organic bin and as a result it isn´t possible to make compost. It is true that it is a little confusing because in Bizkaia in the brown container can only throw remains of vegetables origin, but in this case, they should also throw remains of animal origin (posters were placed in the containers to know that). The separation of glass and plastic containers was done quite well.
Waste management stages:
Period of the implementation: 4/5-11- 2017
Short description: Saturday fair of chocolate and sweets and Sunday Vegetable fair.
Current status (finished, onwards..)Onwards: second meeting will be on 25th October.
Communication tools (main media used etc.)ZamudiOrain local magazine, newspaper and radio. But only to communicate the event, not to say that it is try to sustainable.
Training tools ¿?? Posters in bins and short chats with people of stands (Sunday)
Other tools developed during the campaign (financial, local , ordinance...): No
Target group and N. of stakeholders involved (expected and effective): To this fair arrive people of all Biscay. Sellers and visitors.
Rate of participation (% or number): Thousands.
Key points of success The separation of garbage did not succeed.
Description of the monitoring methodology, if any (surveys, waste weighting, ...). Link to the Social KPI. No.
Qualitative social economical impact / benefit: People after the fair can go to town shops and bars to buy something.
Costs detailed? If yes, details, possibly also normalized (per citizen, per ton...)
Add some pictures of the activityWhere in the folder
Links to press releases, etc. http://www.zamudiokoudala.net/es-ES/Eventos/Paginas/20171105_XXXIIferiadeZamudio.aspx
Lessons learnt: It needs to published before the event that is an ecoevent to be more successful. Compel the participants and sellers to use only compostable tableware.
Other interesting information

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NAME OF THE ACTION: ARIMEN GABA STRATEGIC LINE RELATED: ECOEVENT
Location: Cultural center
Success of the action (0-5): ??
Waste streams: For drinks it use different glasses: for adults crystal glasses and for children cardboard cups. It uses also the cardboard cups to distribute the chestnuts. It wants to throw cardboard cups in the organic (brown) bin (that was opened) to make compost. But the bin of the waste was closed and only could open with the card, so for this reason people throw the waste to the organic bin and as a result it isn´t possible to make compost.
Waste management stages: ??
Period of the implementation: 31-10-2017
Short description: The citizens dressed up and paraded through the streets of Zamudio with the candles they made with used cooking oil. There was also a theater set in the day of the souls. Afterwards, a drink and pumpkin pies were distributed and at the same time there was a demonstration of how to make candles with used cooking oil.
Current status (finished, onwards..): Finished
Communication tools (main media used etc.): city journal, council web, posters.
Training tools : Ecoevent of Lagatzu
Other tools developed during the campaign (financial, local , ordinance...): no
Target group and N. of stakeholders involved (expected and effective): Zamudio citizens.
Rate of participation (% or number): ± 200
Key points of success: The separation of garbage did not succeed
Description of the monitoring methodology, if any (surveys, waste weighting, ...). Link to the Social KPI. No
Qualitative social economical impact / benefit: The chestnuts were bought in Zamudio encouraging the local purchase.
Costs detailed? If yes, details, possibly also normalized (per citizen, per ton...): ??
Add some pictures of the activity: Where in the folder
Links to press releases, etc. ZamudiOrain October (page 14).
Lessons learnt: It needs to published before the event that is an ecoevent to be more successful.
Other interesting information

NAME OF THE ACTION: LAGATZU ECO-EVENT STRATEGIC LINE RELATED: ZERO WASTE EVENTS
Location: Sabino Arana Square
Success of the action (0-5): Non-measured
Waste streams: All
Waste management stages: prevention and sorting
Period of the implementation: June, 2017
Short description: In June, Basque Culture Association fron Zamudio celebrates during the weekend different fostering actions. They make a popular lunch on Sunday where participate 600 people approximately. It has an enormous success, and they come a lot of people from Zamudio and from the valley also. Municipality social fostering worker, talked with the association so as to become the popular lunch in an eco-event. They used a compostable dinner service in order to explain to people which were the main of using it, they print a short explanation on the tablecloth. After the lunch, they collected organic waste cautiously not to contaminate it. For the recycling goal, municipality order to collection service to put a container island in the area. To use containers properly, municipality printed A3 posters to put on the containers, explaining which type of item people could throw in each fraction: organic, light-packaging, paper-cardboard and glass waste. Urban

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solid waste container could not be used by citizens. Only organizers had permission to open it. As well, municipality prepared a project flag to indicate where the island was. After the event, the organic waste was transported to communitarian composting plant (click on here).
Current status (finished, onwards..) Finished
Communication tools (main media used etc.) ZamudiOrain magazine and Aikor magazine, AdiZamudio.
Training tools sorting waste containers, compostable dinner service, printed tablecloth, W4T flag and communitarian composting plant.
Other tools developed during the campaign (financial, local, ordinance...)
Target group and N. of stakeholders involved (expected and effective) General Public
Rate of participation (% or number) 500
Key points of success It is a well-known popular event Municipality workers participate actively during the organization and the lunch day.
Description of the monitoring methodology, if any (surveys, waste weighting, ...). Link to the Social KPI. Participation rate. Volume of each sorting fraction.
Qualitative social economical impact / benefit Some close municipalities have replicated the taken measures, and they have asked if it is possible to use Zamudio's communitarian composting plant.
Costs detailed? If yes, details, possibly also normalized (per citizen, per ton...) We do not have yet all costs counted: Communitarian composting plant. Project flag. Composting dinner service.
Add some pictures of the activity Attached
Links to press releases, etc. Provincial newspaper article: http://www.deia.com/2017/06/26/bizkaia/zamudio-anade-la-vision-eco-a-la-comida-popular-en-favor-del-euskera
Lessons learnt We have a lot of things to improve. We need to speak with all events organizers together.
Other interesting information

NAME OF THE ACTION: SANTI MAMI NEIGHBORHOOD FESTIVALS STRATEGIC LINE RELATED: ZERO WASTE EVENTS
Location: Santi Mami neighborhood
Success of the action (0-5): Non-measured. We ask to an organizer.
Waste streams: All
Waste management stages: prevention and sorting
Period of the implementation: June, 2017
Short description: Santi Mami is a neighborhood of Zamudio and their festivals are on August. After the success of the Lagatzu eco-event, municipality proposed to Santi Mami Festivals organizers, taking some eco-event measures. They did not take so many measures because of the lack of time and organization (festivals are in the middle of the summer vacations). They just put different fraction containers in the stand and on the festival area with explanatory poster where it was explained which type of items should threw in each container. Organizers used the containers which where in the stand properly, in contrast to those which were on the festival area.
Current status (finished, onwards..) Finished

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Communication tools (main media used etc.) ZamudiOrain magazine and AdiZamudio.
Training tools sorting waste containers and communitarian composting plant.
Other tools developed during the campaign (financial, local, ordinance...)
Target group and N. of stakeholders involved (expected and effective) General Public
Rate of participation (% or number) Unknown (3 days-continuous-festivals)
Key points of success
Description of the monitoring methodology, if any (surveys, waste weighting, ...). Link to the Social KPI. Volume of each sorting fraction.
Qualitative social economic impact / benefit
Costs detailed? If yes, details, possibly also normalized (per citizen, per ton...) We do not have yet all costs counted: Communitarian composting plant. Project flag. Composting dinner service.
Add some pictures of the activity Attached
Links to press releases, etc.
Lessons learnt It should have a municipal responsible who takes care and keeps in contact with civil associations in order to facilitate the implementation of Zero Waste Events measures. Asking about how it went on, the organizers told us that there was not enough to put posters in containers to know which fraction went in each container. Nowadays, we have container colors internalized, and even though you put some posters, people do not see them, and they throw away waste all together, without sorting it.
Other interesting information

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1.3 Social Action Plan implementation HALANDRI

6.1.1.4 H1: Educational Centers activities

NAME OF THE ACTION: Educational centers activities
Location: 3rd Vocational Highschool,
Success of the action (0-5): 5
Waste streams: Organic, Prunings, Recyclables, Commingled
Waste management stages: Waste monitoring, Prevention-reuse, Food waste management, home composting
Period of the implementation: November 2017 – present
Short description: The educational program is focusing on four main working areas: - Waste monitoring - Waste Management: prevention/reuse - Home composting - Food Waste The program is constructed in the framework of the "Research on Technology" and "Environmental Program" which are implemented in 2017-2018 in the school and are non-typical forms of education that are approved by the Ministry of Education. It started on October21, and has culminated so far to 6 homework packages which have been presented in class. The actions take place each week, and have been covering 3 of the main working areas, and recycling (secondary working area): <u>Waste Monitoring:</u> The students have measured, characterized and classified waste generated within the school premises, both commingled and recycling bins. The students have used maps so they have been familiarized with basic mapping techniques, they have been using formulas for volume of different shapes (i.e. a bag modeled as a cylinder), measured weight and learned as well notions such as density. A baseline has been established as well for the above, registering the amount of total waste and percentage of recyclables. A short research paper has been prepared as a homework. <u>Home composting:</u> A composter has been provided to the school by the municipality. The students brought presorted biowaste from their home, and gathered prunings from the school yard and leftovers from the school canteen. They have been measuring the temperature, the humidity and pH of the compost. The students have responded extremely well to this project and have installed a second composter. A short research paper has been prepared as homework. <u>Food waste:</u> The students have visited the municipality's facilities, where the key issues of household biowaste have been presented, and the Waste4Think process has been demonstrated. Also, a brown bin has been provided to the school where a demonstration of the collection system also took place. The students collected and measured the weight of biowaste from school bins, the school canteen and a nearby reastaurant. A short research paper has been prepared as homework. <u>Recycling:</u> 1. The students have been using used frying oil to make soaps. This was done in two different timeframes, and the quality, packaging and labeling has been improved. A short research paper has been prepared as homework. 2. The students have visited the Aluminum Recycling Centre, and had lessons in class on the topic of

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aluminum recycling. Two short research papers have been prepared as homework. Waste management: The students have been studying the Municipality's Local Waste Management Plan, and prepared written homeworks which addressed issues such as savings achieved from the reduction of waste. Citizen Science demonstration: For the Waste4Think Demo Day, three groups of students have participated in a first demonstration of a Citizen Science action: using questionnaires prepared by BCN, they gathered information regarding the environmental impact of shops in Halandri, which are to be used for the Local Trade App. As a demonstration, the action went well. However, it does not seem to be replicable in the school, and it is advised that this action should proceed with other groups of volunteers. Reuse/Prevention: These topics have not been dealt with in a distinct manner, however it has been noted that, in the context of the rest of the actions, these issues have come up from the students themselves, which is a clear indication that there are possibilities that these topics could be presented "horizontally". Also, it is scheduled for the school to visit Upatras in April, where a presentation and demonstration of the Treatment Unit (nappies) will take place For the rest of the school year, no further development of the program is in the workings. The focus is now in a) formalizing the program to make it as replicable as possible, and b) presenting this year's experience in the school to root it as firmly as possible, and using moral incentives to attract the interest of more students and teachers for the next school year.
Current status: In progress
Communication tools (main media used etc.)
Training tools: lessons in class and presentations, homeworks and individual research, activities at the schoolyard, use of simple measuring instruments (measuring tapes, scales, thermometers, hydrometers, pH-meters), a composter, paper forms, gloves, demonstrations and visits to the municipality's facilities and other relevant facilities.
Other tools developed during the campaign (financial, local , ordinance…)
Target group and N. of stakeholders involved: 32 students
Rate of participation (% or number)
Key points of success: 1. The teacher who has undertaken the task is very motivated and willing to take initiatives and push things. She also has a background in engineering, so is able to link both technical and educational goals. 2. The teacher has had experience in good waste management practices, so minimal training was required. 3. Budget for supporting educational actions is allocated in ENBIO's budget, so occasional funding for educational activities is possible without time consuming tendering processes.
Description of the monitoring methodology, if any (surveys, waste weighting, …). Link to the Social KPI.
Qualitative social economical impact / benefit
Costs detailed? If yes, details, possibly also normalized (per citizen, per ton…)
Add some pictures of the activity

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Links to press releases, etc.

Lessons learnt:

The main difficulty in working with a vocational school is the fact that vocational schools traditionally attract students with lower expectations and educational ambitions. Sometimes, this is also reflected on the teachers. Environmental awareness is often low in such environments, and certain stereotypes become an obstacle, such as “people who deal with waste are garbage collectors”. It is then an important step forward for us and a testament to the teachers drive that the program has grown strong roots in the school.

It must also be noted that students feel much more motivated when a lesson is followed by actions outside the classroom, especially when such an action is gamified, i.e. presented as a quest. Moreover, students respond well when their work is presented publicly and they are credited for it. Often times, this was enough to ignore altogether stereotypical comments coming from their peers such the ones stated above.

Other interesting information:

It is worth noting that the educational program in this school was not initially designed to be that ambitious.

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The initial planning was that one or two actions would take place, since we initially focused on younger ages. However, the strong personal drive from the teacher of the school made it clear that more could be achieved, and thus we have an experience which we assess as highly replicable.

NAME OF THE ACTION: Educational Program at 6th Gymnasium of Halandri
Location: 6th Gymnasium of Halandri
Success of the action (0-5): 2
Waste streams: household biowaste and prunings, commingled waste bin in class
Waste management stages: composting, monitoring
Period of the implementation: December 2017, present
Short description: The educational program is focusing on four main working areas: - Waste monitoring - Waste Management: prevention/reuse - Home composting - Food Waste The program is constructed in the framework of the "Environmental Program" which is implemented in 2017-2018 in the school and is a non-typical form of education that is approved by the Ministry of Education on a yearly basis. The program started in December 2017, after having faced some difficulties. The main activity of the school has been composting. A series of lessons have been delivered in class, and students have presented individual research on the topic. A presentation has also taken place from the NTUA team in the school, along with the installation of the composter and the initial loading with biowaste, brought by the students from home, and prunings from the school's garden. Monitoring instruments have also been given to the school by the municipality. The process has faced some problems, with the initial batch of the compost going wrong, and a second one as well. The process has been abandoned for this year. Also, actions have been taken to monitor the waste generated in the class. A form has been filled, describing certain types of waste typically found in a class bin (paper, plastic bottles, food packaging, aluminum cans, food, gums, other), and the amount of each type was measured. This will be done again, this time measuring the weight and volume of each type, an also examining bins found outside the class, in other areas of the school.
Current status: In progress
Communication tools (main media used etc.)
Training tools: lessons in class, presentations, homework research, activities at the schoolyard, a composter and simple measuring instruments.
Other tools developed during the campaign
Target group and N. of stakeholders involved: 30 expected, 15 active
Rate of participation (% or number)
Key points of success:
Description of the monitoring methodology, if any (surveys, waste weighting, …). Link to the Social KPI.
Qualitative social economical impact / benefit
Costs detailed? If yes, details, possibly also normalized (per citizen, per ton…)
Add some pictures of the activity

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Links to press releases, etc.
Lessons learnt: The motivation of the teachers and the administration of the school is critical for the success of the program, as well as the continuity from one year to the other. As this is the case, we have to examine ways to present moral incentives to motivate and drive key personnel in the school, and attract the support from other members of the school community.
Other interesting information: The 6th gymnasium was originally scheduled to undertake an full educational program for this year. However, there were significant changes in the school's administration and key personnel which were involved in the process since last year, and the transition proved to be difficult.

6.1.1.5 H3: Foodwaste separate collection

NAME OF THE ACTION: Food separate collection and treatment STRATEGIC LINE RELATED:
Location: Halandri
Success of the action (0-5): 5
Waste streams: Biowaste
Waste management stages: Monitoring, collection, treatment
Period of the implementation: December 2016 - present
Short description: <u>SELECTION/CAMPAIGN</u> The first decision regarding the participation of the citizens was that volunteers were to be selected from the entire municipality and not just one neighborhood. This was expected to have the following advantages: - earlier reach of the target of 240 households

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- easier scaling up of the project
- we would avoid negative feelings and reactions from neighborhoods not participating

The biggest disadvantage would be that the collection routes were going to be longer, both in distance and in time. It was decided that such a trade off is preferable.

The campaign to locate and identify the volunteers was carried out mainly through the distribution of leaflets during the first 2 weeks of September 2016 in a local cultural festival organized by the municipality. We printed 10.000 leaflets, and about 8000 were distributed in the festival. Additionally, an announcement was posted in the front page of the municipality's web page. In both the leaflet and the website, a form was available for the citizens to fill out, along with contact details for further information and assistance (telephone and e-mail).

Citizens were invited to either drop the application at the municipality's offices or send the form by e-mail. It was decided that selection was going to be on a first come-first serve basis. In reality, during the first months of the implementation of the pilot we did not have to deny participation to anyone.

In the first month of this campaign, about 160 households had already applied, and it was estimated that these would be served by deploying about 80 bins. We had already estimated that our ceiling would be about 100 bins. If we surpassed this number, then the most probable outcome would be that the working hours of the collection workers would be stretched to the limit.

We decided at that time to focus on the building blocks where we already had applications and distributed the rest of the leaflets (about 2000) at these building blocks, with the intention to raise the number of households per bin. We achieved good results with this action. In the following weeks, we had about 215 household applications which were served using about 90 bins.

INAUGURAL MEETING

We held the inaugural meeting with the volunteers on December 12, 2016.

Participants were notified by email and telephone calls. About 70% were able to attend.

The meeting was presided by prof. Gerasimos Lyberatos, who is also a city counselor and responsible for waste management strategy development. He gave a presentation of the Waste4Think Project and described the specifics of separate collection of food waste.

The mayor of Halandri, Simos Roussos, also intervened to present the municipality's action plan regarding waste management, and how Waste4Think is planned to be an integral part and a driver of this.

Finally, the volunteers were handed a small 30 lt bin for separate collection, 3 packs of biodegradable bags, keys for the 120 lt bins, and printed instructions.

PILOT DEPLOYMENT

In the following days the 120 lt bins were deployed in spots that had been identified the previous days. At the same time, two routes were designed based on separating the municipality in two sectors and then calculating the optimal path for each route. The selection of the sectors was based on the expert opinion of the director of recycling of the municipality, and the paths were calculated by the company which provides the online monitoring and geolocating services for the municipality's waste management, based on their own optimal path implementation.

A critical point was reached early in the deployment stage, as a significant amount of the 120 lt bins were stolen in the first 2 weeks. By the 10nth day we had already 30 bins stolen. This alarming event could possibly endanger the survival of the project, since we knew that the early days would be critical for a solid adoption of good habits from the volunteers. We solved this problem by aquiring padlocks and using them to secure the bins in fixed spots, i.e. traffic signs, trees etc. Since then, we have had only rare occurrences of theft. However, we have reached the conclusion that 120 lt bin is very easy to steal, and we should opt for larger 360 lt bins for future tenders.

CONTACT WITH VOLUNTEERS

We have established a series of channels which we use to keep in touch with the volunteers, and also to provide information and promote the project to the general public.

First of all, we have provided the volunteers with 2 phone numbers. In the first weeks this was the main channel. About three quarters of the calls we were receiving had to do with questions regarding sorting, and the rest were to report events i.e. broken or stolen bin, and from interested households.

We created 2 facebook groups; Waste4Think Halandri and Halandri Recycling. These are used mainly to transmit news about the project, i.e. progress of the experiments, important conducted measurements etc, but has gradually evolved into a very vivid community where also ideas and experiences among volunteers are shared. Also, a significant amount of volunteers choose facebook messenger as the

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preferred method of posing questions and reporting events. Currently, Waste4Think Halandri page has 550 followers, 70 posts have been made. The best performing one is the post of the video which was produced for the M12 Meeting in Seveso (1.3K views, 19.2K resonance).
Waste4Think has a sector in the municipality's website, however it is not a very useful tool, since the municipality's site is in need of an update and has a low visibility. For instance, the same video which had 1.3k views in facebook had less than 60 views from the municipality's youtube account (they were uploaded the same day). It seems that at the present the municipality's website is not a good channel for the project and is going to need a proper update if we are going to include it in our plans for dissemination.

FIRST SURVEY

In March 2017 a survey took place to establish the self-evaluation of the volunteers in matters such as sorting habits, general knowledge in waste management and satisfaction of their participation of the program. The results indicate that a) this population has better habits and knowledge than the average population, and also shows a high degree of satisfaction from their participation, both generic and as regarding the operation of the program (collection rate etc).

SECOND MEETING WITH VOLUNTEERS

In June 2017 a second meeting took place. Prof. Lyberatos presented the progress we had been making in the pilot and in research, and answered a series of questions. Participation was, however, low, at about 85 volunteers. This can be attributed to the extremely high temperatures of the specific day.

WASTE ANALYSIS

In November 2017 a waste analysis took place to a sample of about 5% of the participating households. All the three main waste streams were examined: commingled (green bin), recyclables (blue bin) and food waste (brown bin).We measured: a) the total amount per bin generated by our sample for 12 days, and b) the quality of the sorting. The results show that the population of participating households generate less and sort better than average, and confirm our initial assumptions that this population has much better habits than the general population not only in sorting, but also in prevention.
These are the results:

Daily quant ty per day (kg)	Green bin	Blue bin	Brown bin	Total
	0.096863	0.073725	0.309804	0.480392
percentage	20%	15%	64%	100%

Qualit ve results (percentage)	Green bin	Blue bin	Brown bin	Total
Green bin	68%	6%	26%	100%
Blue bin	4%	90%	5%	100%
Brown bin	1%	1%	98%	100%

SURVEY FOR GENERAL POPULATION

A questionnaire was prepared in line with the one proposed in the Social Actions Plan, and a survey took place in December/January, in a random sample of 756 inhabitants.
The key results can be summarized as follows:
1. The majority of the population is satisfied with the cleanliness level of the muncipality (70% “enough” and “a lot”).
2. About 10% participate in some of the initiatives of the Municipality regarding good waste management
3. Almost the entire population ignores what prevention is, or has it confused with recycling etc.
4. Almost the entire population stated that they recycle at least once per week. This result is not in line with the amount generated as it is officially measured, which deems this result inconclusive. The same goes for the rest of the results regarding sorting, and indicates the need for a specific question (YES/NO) regarding recycling/sorting.

Current status (finished, onwards..): In progress

Communication tools (main media used etc.): E-mail lists, facebook page, telephone support, regular meetings with participants

Training tools: leaflets with instructions, telephone support, training meeting

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Other tools developed during the campaign (financial, local , ordinance…)
Target group and N. of stakeholders involved (expected and effective) 240 households
Rate of participation (% or number)
Key points of success: 1. The separate collection in the households is done in a way that minimizes the change in the daily routine, so it is easily adopted. 2. The households that have responded to the program seem to be more aware than the general public on waste management good habits, i.e. 100% of them replied that they were recycling before joining the program.
Description of the monitoring methodology, if any (surveys, waste weighting, …). Link to the Social KPI.: 1. Each bin is weighted at collection. The total amount of biowaste treated is also weighed for cross reference reasons. This way, it is possible to calculate the mean production of organics per citizen. 2. A sampling took place in November, studying waste generation in participating households. We examined all 3 bins (green, blue, brown), measured the weight and characterized the waste found in each bin (and its respected households) to monitor the level of separation. This has been cross referenced to the data we have for the whole of municipality. 3. A survey has been done targeted at participating citizens. 4. A survey has been done targeted on the general population, based on the questionnaire in the Annex of the Social Action Plan. KPIs: Number of households participating in food waste separate collection gr/inhabitant participating Food waste collection rate in selected families in Halandri % in relation to biowaste generation Quality of waste discharged (impurities) Cost per ton of food waste collected/treated
Qualitative social economical impact / benefit
Costs detailed? If yes, details, possibly also normalized (per citizen, per ton…)
Add some pictures of the activity

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Links to press releases, etc. :
https://www.facebook.com/W4THINK
http://www.halandri.gr/Default.aspx?lang=el-GR&page=386&newsid=6324
http://www.halandri.gr/Default.aspx?lang=el-GR&page=386&newsid=6905
http://www.halandri.gr/Default.aspx?lang=el-GR&page=386&newsid=5785
http://www.halandri.gr/Default.aspx?lang=el-GR&page=386&newsid=5544
http://www.halandri.gr/Default.aspx?lang=el-GR&page=386&newsid=6980

Lessons learnt:
1. We find that collection twice a week is adequate and citizens are satisfied with it (i.e. acceptable odors).
2. The satisfaction level of the participants is very high. This indicates that participation by itself is a moral incentive.
3. The separate collection of the participants is very fastidious. It is possible that a more “relaxed” separate collection could enhance the amounts of organics collected, with insignificant change in the impurities.
4. The characteristics of the participants of the program tend to differ from the general population, in that they present much higher awareness levels and tend to have more good practices and habits. Expansion of the program to the general population of the municipality will present much higher needs for training, awareness raising and conformity with a new program. However, we need to construct a new questionnaire targeted on the participants that is more in line with the questionnaire which was targeted to the general population.
5. Average consumption of biodegradable bags is 2-3 bags per week.
6. A lockable bin for collection seems to be necessary, since every bin that for some reason was left open (i.e. malfunctioning lock) was filled with impurities from improper use by non-participants.

Other interesting information

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