

wastein
progress

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7th Edition

Definitions and standard for Indicators for MSW management

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About myself



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1 Why indicators

The 65% EU recycling targets



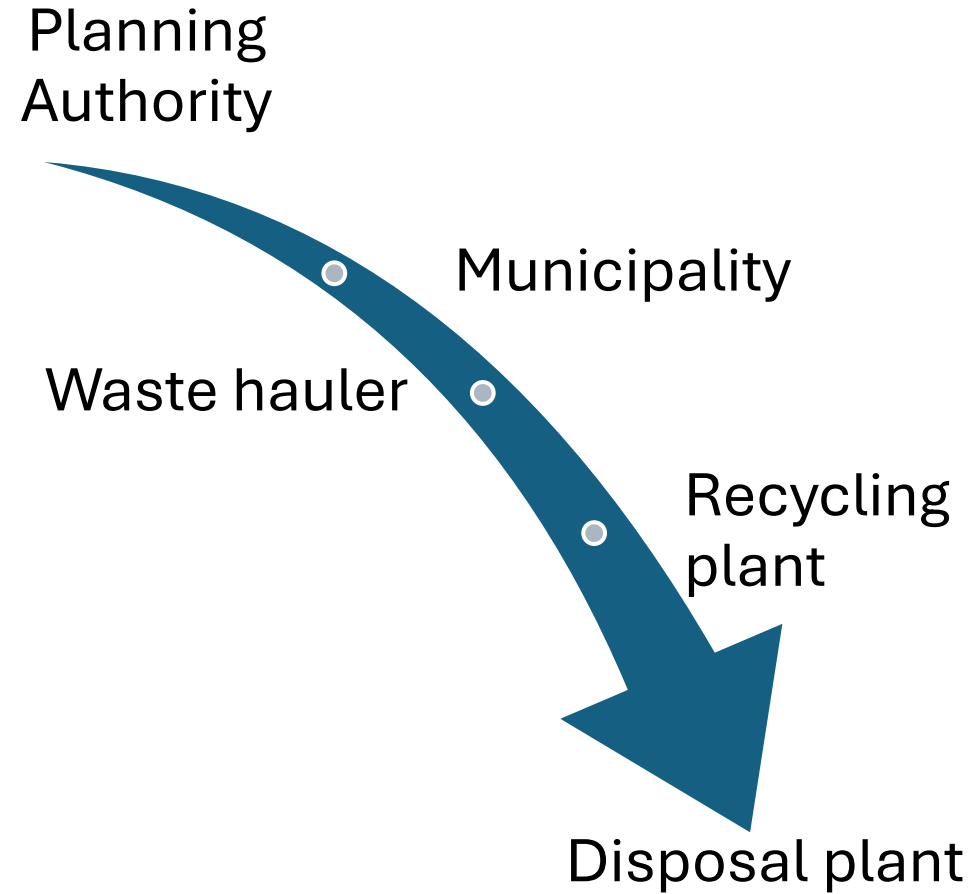
- Reduce the quantity of residual waste collected
- Increase the quantity of separate collection (bio-waste is pivotal)
- Identify MSW generators (responsibility and accountability)
- Apply (possibly) PAYT

But: how to evaluate existing MSW collection and recycling schemes?

MSW management and indicators

Different point of views.....

MSW management and indicators



MSW management and indicators

Planning Authority

- Fulfilment of EU and National Targets

Municipality

- Total costs of the service
- Changes requested to households

Waste hauler

- Complexity of the logistics
- Labour vs Capex intensive

Recycling plant

- Quality/Purity
- Quantity

Disposal plant

- Quantity

2 A deep dive on indicators for bio-waste management

A set of indicators



The bio-best project:

- focuses on bio-waste management
- creates an improved and homogenised dataset about municipal bio-waste management in 27 MS
- defines a set of Key Performance Indicators (KPI) to guide European institutions focusing on national legislation calculation methodology for recycling targets

A set of indicators



KPIs are divided into three distinct groups

1. Collection (& transport)
2. Recycling (Composting, Anaerobic Digestion (AD))
3. Enabling legislation or regulation

KPIs are described as

- i. Quantitative
- ii. Qualitative

→ can be applied also to other MSW streams

n 11 KPIs for: Collection (& transport)

Type of data	KPI (Collection)	Function & Description	Comment
Quantitative KPI01	Quantity of bio-waste/food-waste collected (kg/person/year)	Compares locally collected quantities with regional and national performances	Comments on quantitative data by describing which waste producers are included into the scheme. Does not include information on the actual composition of the waste stream Data (fresh matter) including contaminants. Comments on if home/decentralised composting was promoted and to which extent Important to know KPI02 for the comparison of quantities
Quantitative KPI05	Contaminants inside bio-waste/food-waste collected (% of total bio-waste)	Quality of bio-waste as the degree of purity. Shows recycling potential at a treatment facility	Requires a waste composition analysis. Assessment on a fresh matter basis. Needs to include definition of which materials are considered as contaminants Consider contaminants as: metals, glass, conventional plastics, Waste from Electrical and Electronic Equipment (WEEEs), tyres and other bulky waste. Biodegradable and compostable plastics should also be mentioned separately regardless, if allowed or not Potentially relies on KPI03. Specify if contaminants relate to either food waste or green waste (mixed bio-waste collection might have lower impurities due to dilution effect)
Quantitative KPI07	Reduction of mixed/residual waste (% reduction with baseline year in kg/person/year)	Impact of bio-waste collection (and its setting) on mixed/residual waste quantities	Can be used to assess the effects of bio-waste separate collection introduction or changes in the collection system (e.g. change of collection fee, introduction of a PAYT fee system). A steady reduction over a longer period or a sharp decrease in residual waste can be an indicator for a successful waste management plan Can be used to identify Best Practice cases that are worth a more detailed investigation The considered baseline year with the result should be indicated

n 11 KPIs for: Collection (& transport)

Type of data	KPI (Collection)	Function & Description	Comment
Qualitative KPI09	Ratio of collection frequency of bio-waste to mixed/residual waste collection (-)	Highlights the convenience of bio-waste collection compared to residual waste collection	Describes the level of convenience towards bio-waste collection compared to residual waste collection KPI to be applied mainly to schemes with fraction delivery calendar like door-to-door (DtD) schemes To be assessed on a local level (municipality). Average can be used on a regional level Express result as a fraction (e.g. 3/1)
Qualitative KPI10	Ratio between collection costs for bio-waste Vs. collection costs for mixed/residual MSW (-)	Compares the cost for a municipality to collect bio-waste with the one for collecting mixed/residual MWS	Allows to assess the cost efficiency of the two main schemes for MSW collection Cost shall include Value Added Taxes (VAT) if VAT is a cost for local authorities Express result as a fraction (e.g. 4/2)
Quantitative KPI11	Diversion rate of bio-waste/food-waste (% of bio-waste generated)	Describes quota of bio-waste/food waste collected separately vs. total generated. Specifies the effectiveness of the separate collection scheme set up, according to the quantities of bio-waste collected separately and non-separately. The percentage shows the part that is sent to recycling	This indicator can be approached on 2 sub-levels by calculating it with different information depending on their availability with increasing level of detail: - Using KPI01 and KPI08 (gross diversion rate) This level can be used if only an analysis of residual waste composition is available: - Using KPI01, KPI05 and KPI08 (net diversion rate) This level can be used if an analysis of both, bio-waste and residual waste composition is available In general, both levels allow to analyse specific diversion rate of either total bio-waste but also food waste or green waste separately. Only the second level in combination with reporting on KPI05 gives a feedback on the success of bio-waste separation as the contaminants are discounted

KPIs for: Collection (& transport) in practice

KPI n	KPI type	KPI (Description)	Hernani (ES)	County of Debagoiena (ES)	Matarò (ES)	Bratislava (SK)	District of Straubing (DE)	Münster (DE)	District of Kempen (BE)
KPI09	Qualitative KPI09	Ratio of collection frequency of bio-waste to mixed/residual waste collection (-)	3/1	3/1	3/7	2/1	1/1	2/1	1/1
KPI10	Qualitative KPI10	Ratio between collection costs for bio-waste Vs. collection costs for mixed/residual MSW (-)	1,9	1,2	0,4	0,7	0,6	1,0	1

- better to collect Bio-waste more frequently than residual/mixed MSW
- Costs do not increase linearly

n 7 KPIs for: Recycling (plants)

Type of data	KPI (Recycling)	Function & Description	Comment
Quantitative KPI12	Ratio between rejects/total inputs (% of total input)	Describes recycling efficiency of a biological treatment facility	A global indicator referring to the quality (purity) of input bio-waste and the technical performance of the process
Quantitative KPI14	Ratio between treatment cost for bio-waste collected separately and cost for treating mixed /residual MSW (-)	Highlights the economic viability of bio-waste separately collected and sent to recycling compared to unsorted MSW disposal	KPI to be assessed starting from the gate fees in €/ton for the two treatment options considered. The cost must include disposal taxes Express result as a fraction (e.g. 2/5)
Quantitative KPI15	Average price for compost/digestate sold (€/t)	Describes the average value of a compost/digestate product specific for a treatment facility	To be assessed per facility. Average can be used on a regional level

KPIs for Recycling in practice

- Disposal fees should not be lower than recycling fees

KPI n	KPI type	KPI (Description)	Hernani (ES)	County of Bergueda (ES)	County of Debagoiena (ES)	Matarò (ES)	Milan (IT)	Parma (IT)	Bratislava (SK)
KPI14	Quantitative KPI14	Ratio between treatment cost for bio-waste collected separately and cost for treating mixed /residual MSW (-)	0,8	1,0	0,7	1,7	0,7	0,7	0,5

KPIs for Recycling in practice

- Significant potential for increasing the performance of recycling facilities

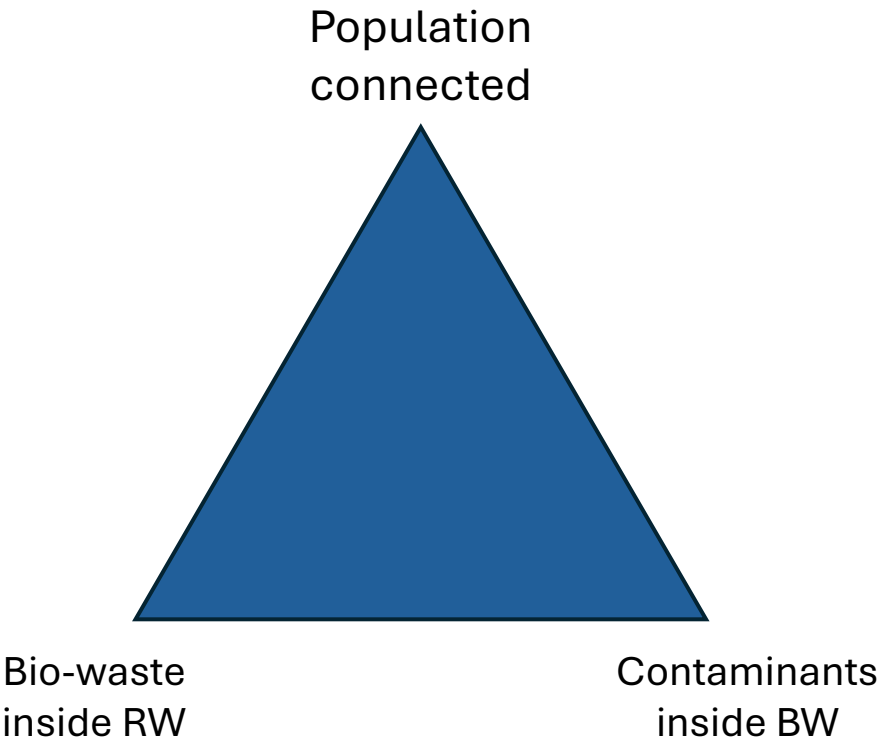
KPI n	KPI type	KPI (Description)	Hernani (ES)	Matarò (ES)	Parma (IT)	District of Straubing (DE)	Münster (DE)
KPI05	Quantitative KPI05	Contaminants inside bio-waste/food-waste collected (% of total bio-waste)	<1%	6%	3,3%	1,2%	4,2%
KPI12	Quantitative KPI12	Ratio between rejects/total inputs (% of total input)	40%	35%	23%	3%	10%

n 5 KPIs for: Enabling Legislation

Type of data	KPI (Enabling legislation)	Function & Description	Comment
Qualitative KPI19	Legal prescription/ obligation to sort for bio-waste specific waste generators	Provides evidence of existing legal drivers for local authorities to set up separate collection schemes for bio-waste	The KPI does not assess enforcement
Quantitative KPI20	Targets for separate collection (of bio-waste)	Provides evidence of specific targets for local authorities to set up separate collection schemes for bio-wastes that are efficient	The target can address different types of MSW producers, of organic waste or municipalities by size Express result as % of generated or kg/person/year
Quantitative KPI21	Main targets for separate collection or recycling of MSW	Drives local authorities to set up separate collection schemes for packaging/dry recyclables and/or bio-waste	Quote if target is applied at national or regional or municipal level
Quantitative KPI22	Limit on contaminants for bio-waste accepted at compost/AD facilities	Drives local authorities to collect bio-waste with schemes and procedure that ease the recycling step and minimise rejects from the recycling process	Quote if target is applied at national or regional level Express result as % to input flow
Qualitative/ Quantitative KPI23	Economic incentives to promote separate collection of bio-waste or disincentives to dispose "bio-waste rich" residual waste	Indicates existing specific legislation or regulation addressed at local authorities and recycling plants	These types of instruments help local authorities to divert economics from MSW disposal to bio-waste management. Economic incentives should not include PAYT fees but rather penalty/premium schemes to be applied to municipalities (not to waste producers)

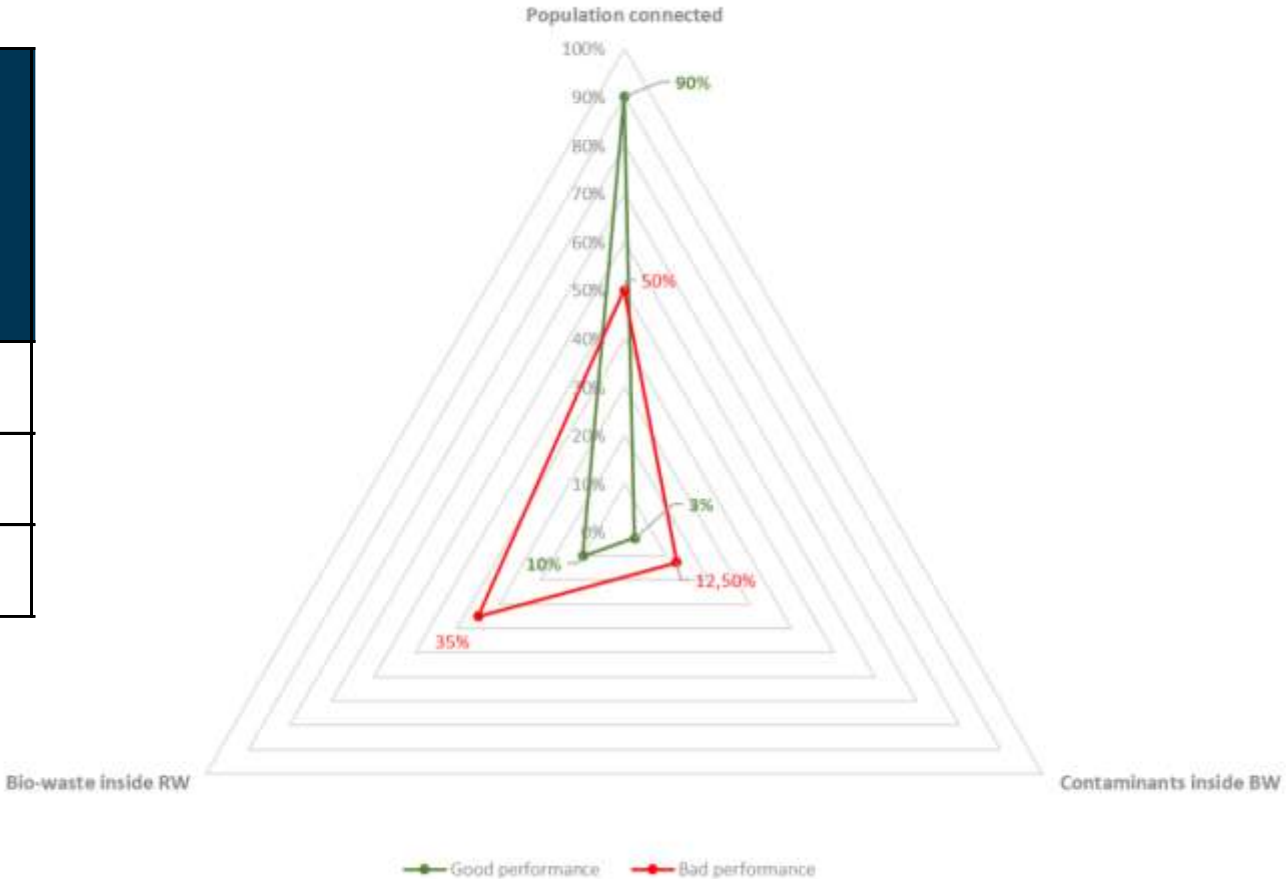
Three KPIs to assess the overall results of separate collection schemes for bio-waste

KPI n	KPI type	KPI (Description)
KPI04	Quantitative KPI04	Population connection rate to bio-waste/ food-waste collection scheme (% of total population)
KPI05	Quantitative KPI05	Contaminants inside bio-waste/food-waste collected (% of total bio-waste)
KPI08	Quantitative KPI08	Quantity of bio-waste inside residual waste (kg/person/year)



Three KPIs to assess the overall results of separate collection schemes for bio-waste

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KPI08	Quantitative KPI08	Quantity of bio-waste inside residual waste (kg/person/year)



Three KPIs to assess the overall results of separate collection schemes for bio-waste

KPI n	KPI type	KPI (Description)	Maia (PT)	Hernani (ES)	County of Bergueda (ES)	County of Debagoiena (ES)	Matarò (ES)	Milan (IT)	Parma (IT)	Bratislava (SK)	District of Straubing (DE)	Münster (DE)	District of Kempen (BE)
KPI04	Quantitative KPI04	Population connection rate to bio-waste/ food-waste collection scheme (% of total population)	43%	80%	90%	100%	100%	100%	100%	53%	70%	80%	70%
KPI05	Quantitative KPI05	Contaminants inside bio-waste/food-waste collected (% of total bio-waste)		<1%	3%	5%	6%	5,4%	3,3%	2,0%	1,2%	4,2%	5,0%
KPI08	Quantitative KPI08	Quantity of bio-waste inside residual waste (kg/person/year)	75	1	6	19	51	19	28,5	54		32	28

3 A comparison on different MSW collection schemes

Indicators applied to two types of collection schemes



Indicators applied to two MSW schemes

Parma (DtD & PAYT)



Brescia (RC & ID systems)



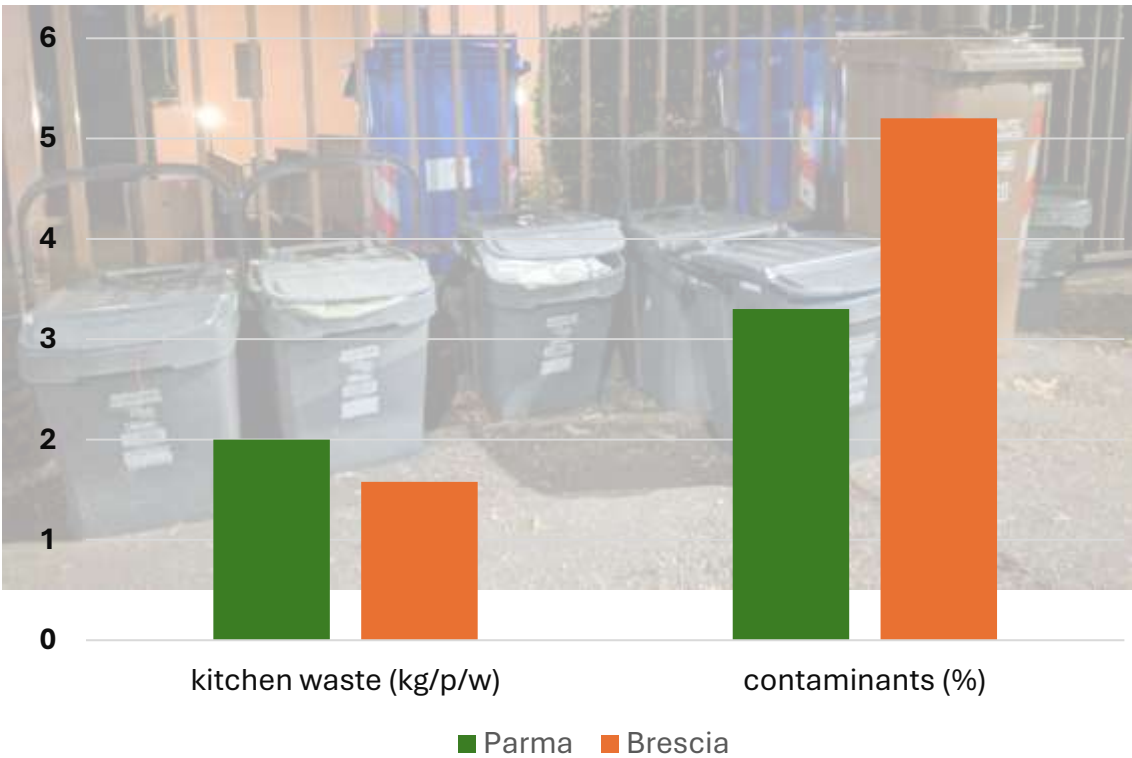
Indicators applied to two collection schemes

Indicators/Factors	Door to Door (pick-up scheme)	Road Container (bring scheme)
Logistics	Complex, Labour intensive	Simple Capex intensive
Diversion of recyclables	High	Medium (Low)
Quality of sep. collection	Good Can be monitored	Critical Take what comes
Awareness	Significant impact	Low to medium impact
Side-effects	Waste dumping and drift (at producers site)	Waste littering (next to collection points)

Indicators applied to two MSW schemes

Parma (DtD & PAYT)

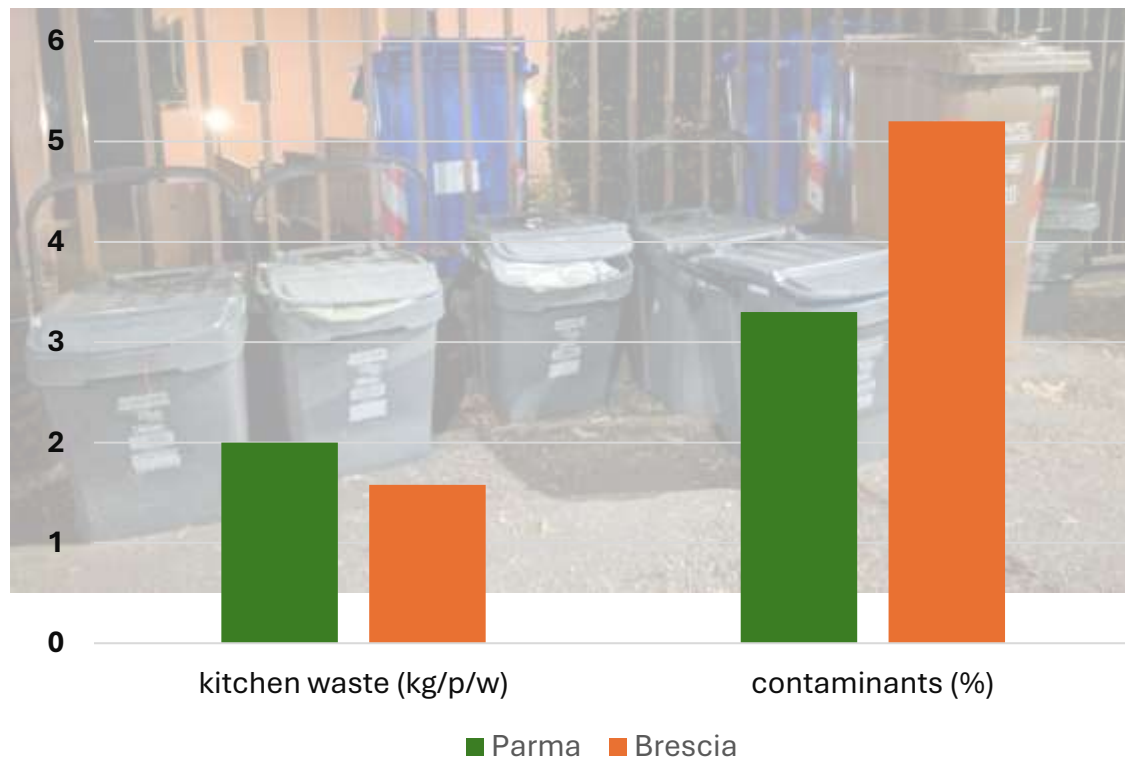
Brescia (RC & ID systems)



Waste quantities , year 2017

Indicators applied to two MSW schemes

Parma (DtD & PAYT)



Brescia (RC & ID systems)

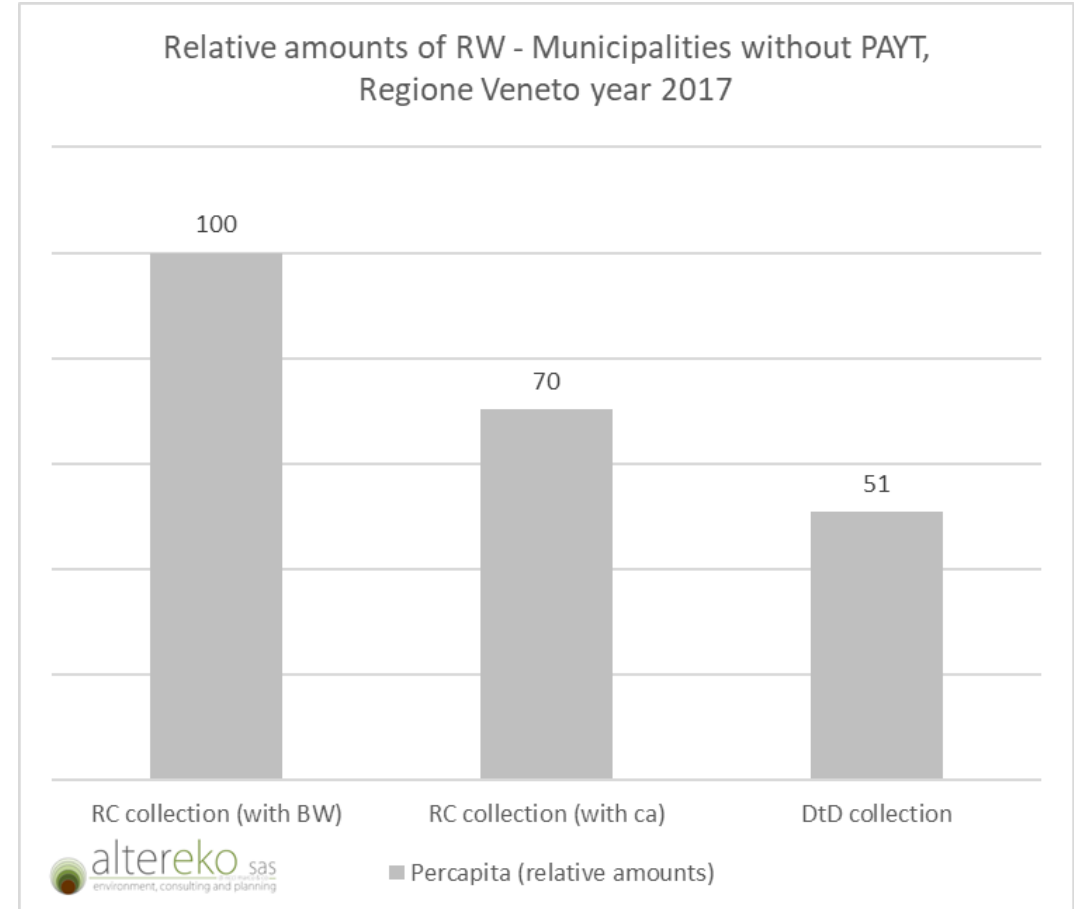


Waste quantities , year 2017

A “simple” statistical analysis on a consistent set of data

- based on MSW data production in all municipalities of Veneto Region, year 2017,
- Average amounts for municipalities without PAYT
- RW generation compared to “conventional” RC collection:
 - 30% reduction for schemes with controlled access
 - 49% reduction for schemes with intensive door-to-door

Source: Analysis performed by Altereko on ARPAV data for the year 2017



4 Look at the broader picture

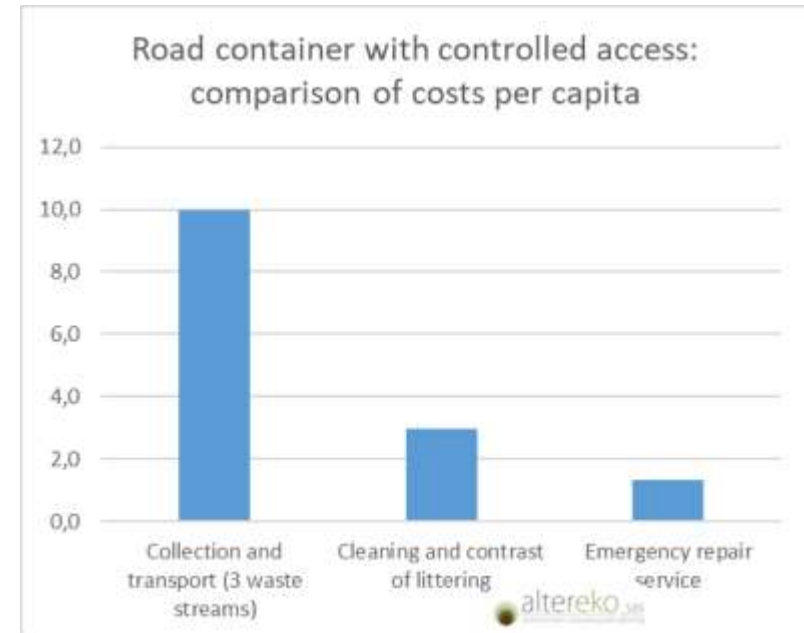
Do not over-focus on a single waste stream

What KPIs don't tell you

- Consider side-effects
 - MSW dumped
 - MSW tourism
- Consider the additional services or «musts»
 - Information
 - Checking and User Feedback
- There are effects that are «priceless»
 - Awareness of waste generators

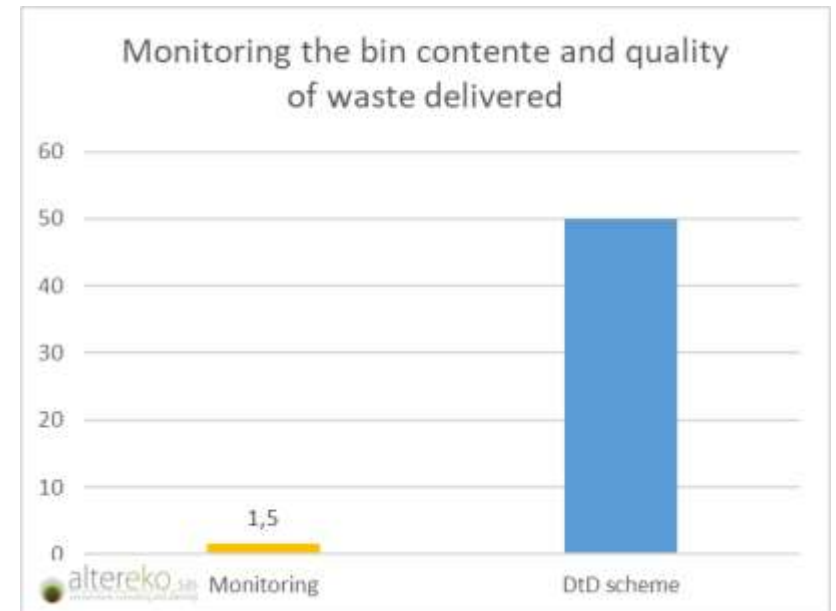
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What KPIs don't tell you

- Consider side-effects
 - MSW dumped
 - MSW tourism
- Consider the additional services or «musts»
 - Information
 - Checking and User Feedback
- There are effects that are «priceless»
 - Awareness of waste generators



What KPIs don't tell you

- Always consider the larger picture
- Consider side-effects
 - MSW dumped
 - MSW tourism
- Consider the additional services or «mu»
 - Information
 - Checking and User Feedback
- There are effects that are «priceless»
 - Awareness of waste generators
 - Customer satisfaction

Case	Collection scheme	Customer satisfaction
IT1 (2015)	From RC to DtD & PAYT	78% of HH satisfied with the change of collection scheme
IT2 (2015)	From RC to DtD & PAYT	86% of HH satisfied with the change of collection scheme
IT3 (2014)	From RC to DtD	71% of HH has a positive opinion about the new scheme
IT4 (2017)	From RC to DtD & PAYT	Customer satisfaction increased from 6.8 to 7.2 (+6%)
IT5 (2016)	From RC to DtD & PAYT	88% of customer are "very" or "sufficiently" satisfied by the service
Data refer to Cities in Italy with more than 80'000 inhab.		

Conclusions

- Indicators are essential for comparing different municipal solid waste (MSW) management schemes.
- A clear, consistently applied, and regularly evaluated set of indicators should be established.
- Boundary conditions, including supportive legislation and existing barriers, must also be taken into account.
- A broad and integrated perspective is needed, rather than focusing solely on one collection method.
- EU targets can serve as a benchmark for assessing overall outcomes, but costs always to be evaluated on a more “regional” context.
- Higher collection and transport costs should be seen as an “investment” that helps reduce future disposal expenses.

Grazie Gràcies Thank you

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