



CirBioWaste

**Interreg
Euro-MED**



Co-funded by
the European Union

“CirBioWaste”

Fostering innovative and sustainable bio-waste management and circular bio-economy in the Mediterranean area

Online Training 1 OVERVIEW of BIO-WASTE COLLECTION in the EU

January 16th

Michele Giavini, CIC

UAB
Universitat Autònoma
de Barcelona



zero.



OVERVIEW of BIO-WASTE COLLECTION in EU



Based on:

➤ Slides - Acknowledgments:

- BIC / ZWE Report (2nd edition – 2024) (E.Favoino, M.Giavini)
- CIC – Consorzio Italiano Compostatori
- E. Favoino – Scuola Agraria del Parco di Monza
- LIFE BIOBEST project
- ARS ambiente data processing and nudging campaigns
- EEA data



Co-funded by
the European Union



CirBioWaste

Interreg
Euro-MED

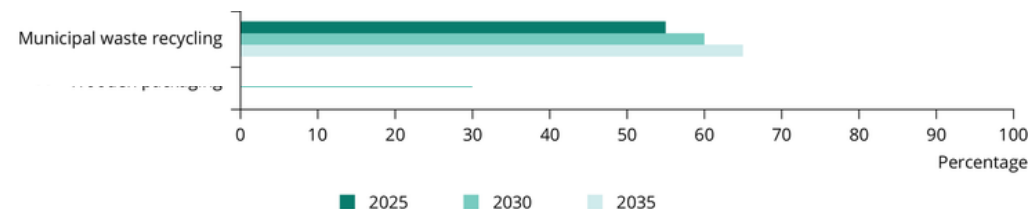


Co-funded by
the European Union



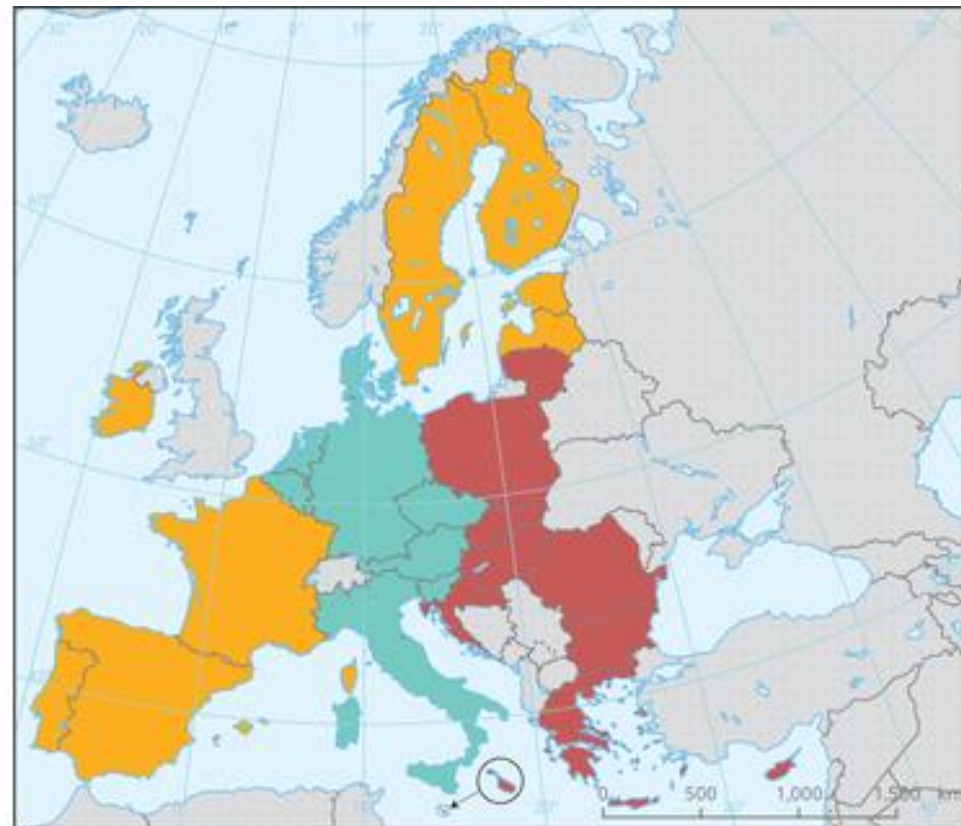
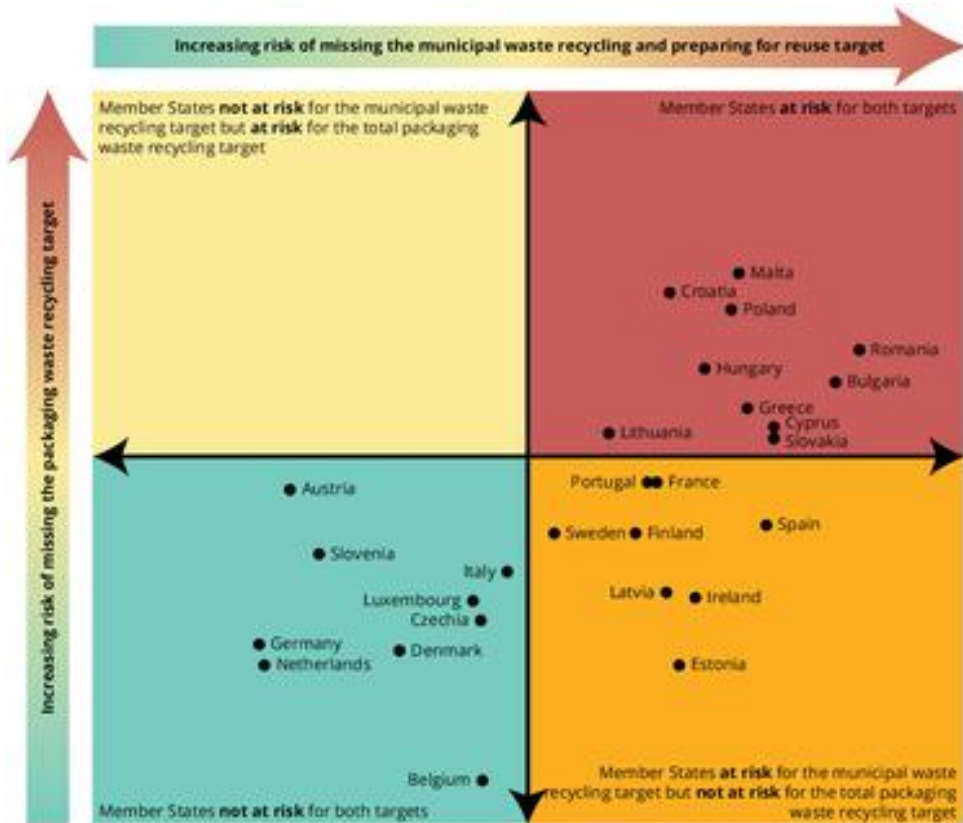
The key role of bio-waste

- **Fundamental to meet the EU material recovery targets (65% “preparation for recycling and reuse” by 2035)**
- **At the crossroads of various env policies (waste, CAP, climate change...)**
- **Obligation for separate collection (art. 22 WFD)**
- **18 Member States at risk of not meeting the 55% target for municipal waste preparing for re-use and recycling in 2025**



Bio-waste is the largest single component of municipal waste. Separate collection of bio-waste for a large part of the population is therefore key in helping Member States reach their recycling target for municipal waste (EEA, 2023). In general, it was found that Member States at risk of not meeting their recycling target had neither convenient, separate collection in place for most of the population nor adequate, available treatment capacity. However, most of these Member States plan to improve the convenience and coverage of their bio-waste collection service in the coming years. Paying proper attention to how these plans are implemented will be key for meeting the targets.

Source EEA, 2025



Reference data: ©ESRI

Prospects for EU Member States of meeting the recycling targets for municipal waste and packaging waste

Risk score

- Member states not at risk for both targets
- Member States not at risk for the municipal waste recycling target but at risk for the total packaging waste recycling target
- Member States at risk for the municipal waste recycling target but not at risk for the total packaging waste recycling target
- Member states at risk for both targets
- Outside coverage

Source EEA, 2025



CirBioWaste



Co-funded by the European Union

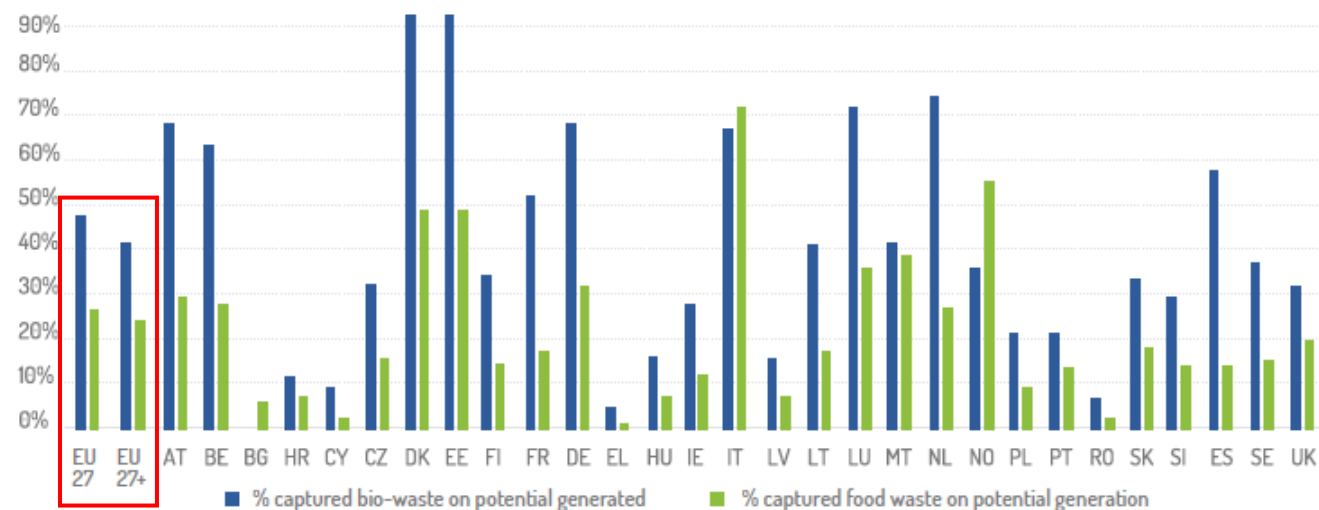


Framing the issue: BIC/ZWE Report



<https://zerowasteurope.eu/library/bio-waste-generation-in-the-eu-current-capture-levels-and-future-potential-second-edition/>

- **BIC-ZWE report, 2024**
 - Results for EU27 (+ UK, NO)
 - Current capture levels
 - Comparison to potential
 - A few best practices
 - Country fact-sheets
- **Despite the mandate for separate management of bio-waste, still captures are comparatively low**
- **The "untapped potential" is particularly large in the area of kitchen bio-waste**
- **Quality is often not satisfactory**
- **STARTING POINT: an obligation, not supported by legally binding targets, often does not trigger performing and result-oriented schemes**



CirBioWaste



Co-funded by the European Union

Food waste and bio-waste: potential generation vs. current capture - 2020 (EU 28+)



	Estimated generation		Current capture level		Captured
	<i>t/y</i>	<i>Kg per capita</i>	<i>t/y</i>	<i>Kg per capita</i>	%
Bio-waste	113,816,770	222	36,675,887	71	32%
Food waste	59,938,718	117	9,520,091	19	16%



Food waste and bio-waste: potential generation vs. current capture - 2024 (EU 27+)

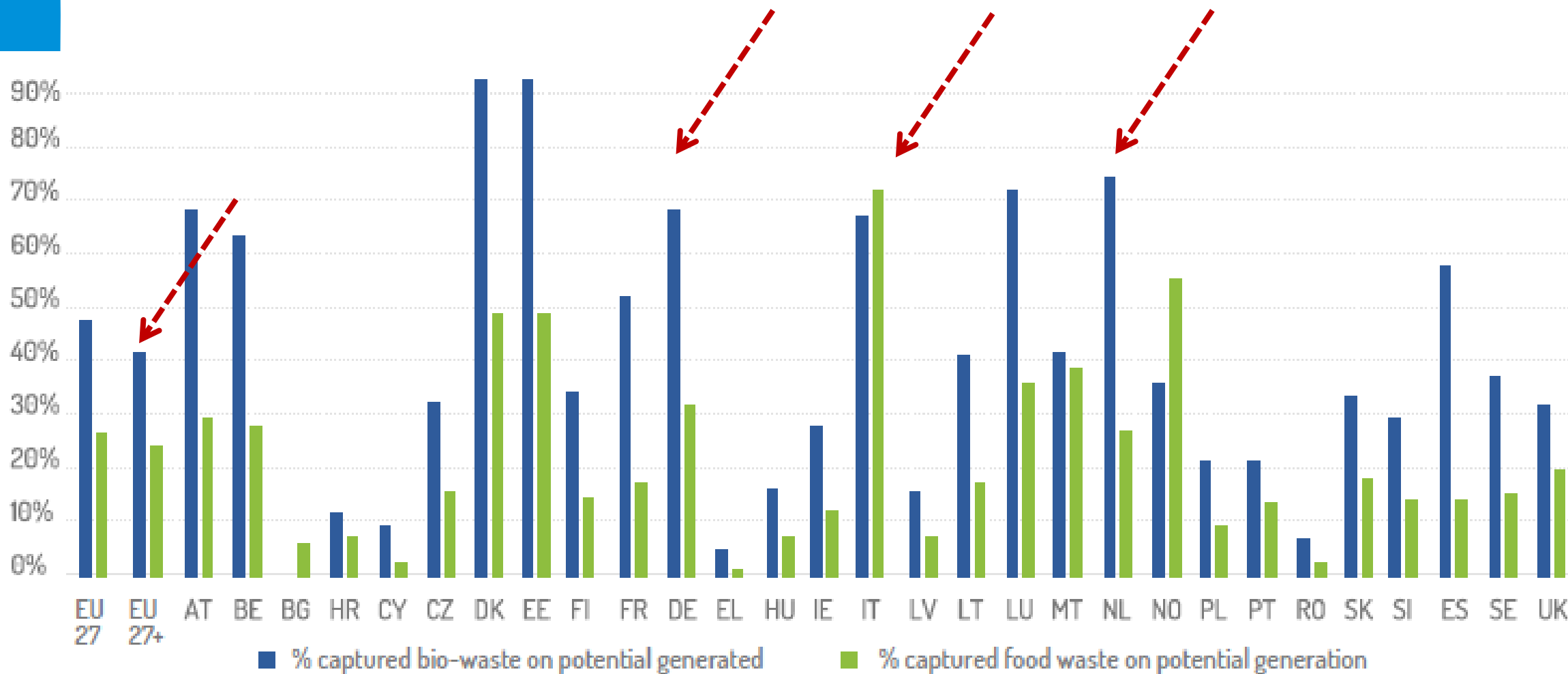


	Estimated generation		Current capture level		Captured
	<i>t/y</i>	<i>Kg per capita</i>	<i>t/y</i>	<i>Kg per capita</i>	%
Bio-waste	113,738,053	219	51,036,874	98	45%
Food waste	60,034,681	116	15,112,788	29	25%





The “distance to target”





Municipal biowaste

Source separated food waste <ul style="list-style-type: none">•Residential•Commercial•Large generators (markets...)	Source separated biowaste (commingled food + garden waste)	Garden waste
---	---	---------------------



1. Member States shall ensure that, by 31 December 2023 and subject to Article 10(2) and (3), **bio-waste** is either separated and recycled at source, or is collected separately and is not mixed with other types of waste.



Collection models for organics

- **Garden waste only**
- **Biowaste («commingled»: garden + food waste)**
 - VGF/GFT (NL, Flanders - no meat/fish)
 - *Bioabfall* (Central Europe - includes meat/fish, commingled with garden waste)
- **Dedicated collection: “bespoke” kitchen waste schemes**
 - Kitchen waste at the kerb
 - Garden waste with a dedicated collection round (less frequent, seasonal) and Amenity Sites

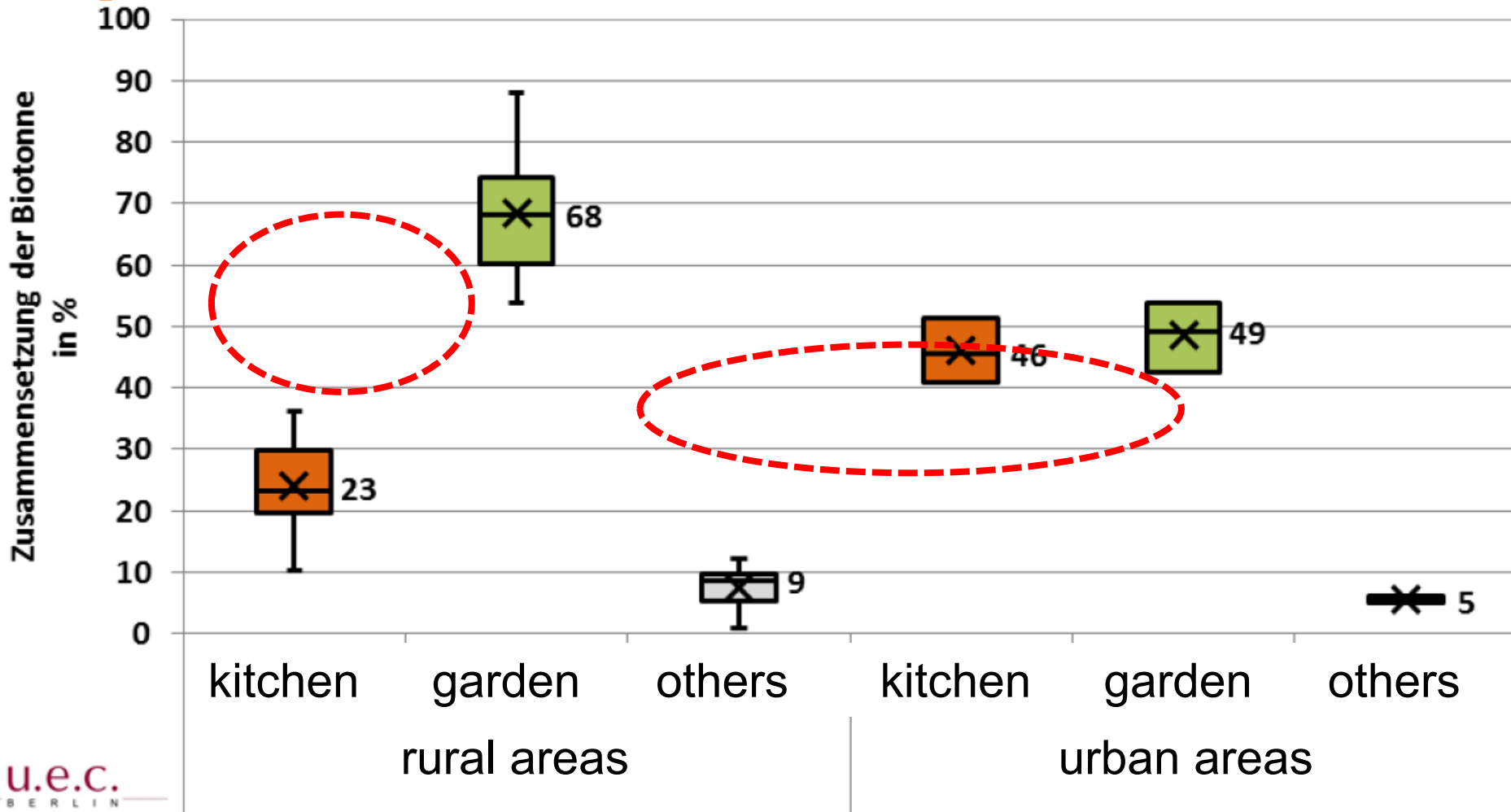




Dedicated schemes for food scraps (kitchen waste): cheap, open lorries



“commingled” collection - Germany composition of biowaste bins





Biowaste collection and cost saving

- A lot of optimizations allow to keep overall costs low:
- Focus on **kitchen waste**, avoid intensive garden waste collection
 - **Light vehicles**, driver only, bi-compartment, door to door
 - **Reduce collection frequencies** of residual waste to a minimum and adapt those of food waste to seasonality and storage
 - Look at **capture rates** (aim at >50 kg/capita/year)

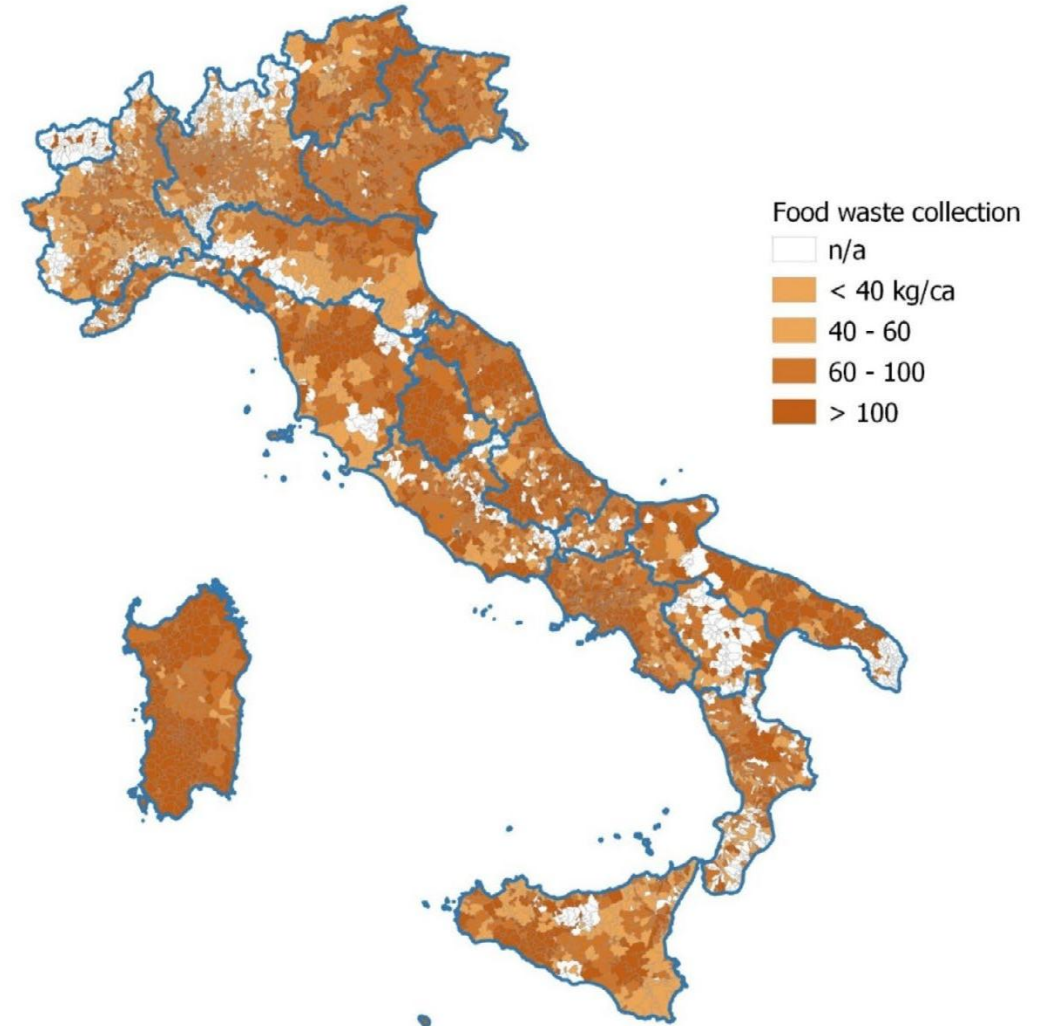




What is needed for this to happen

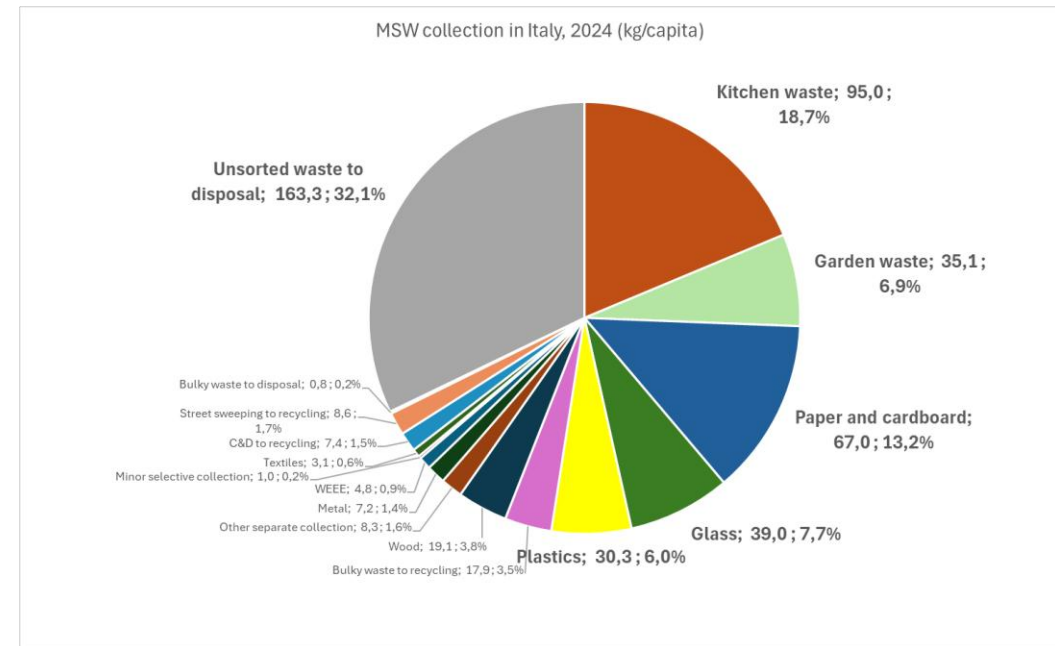
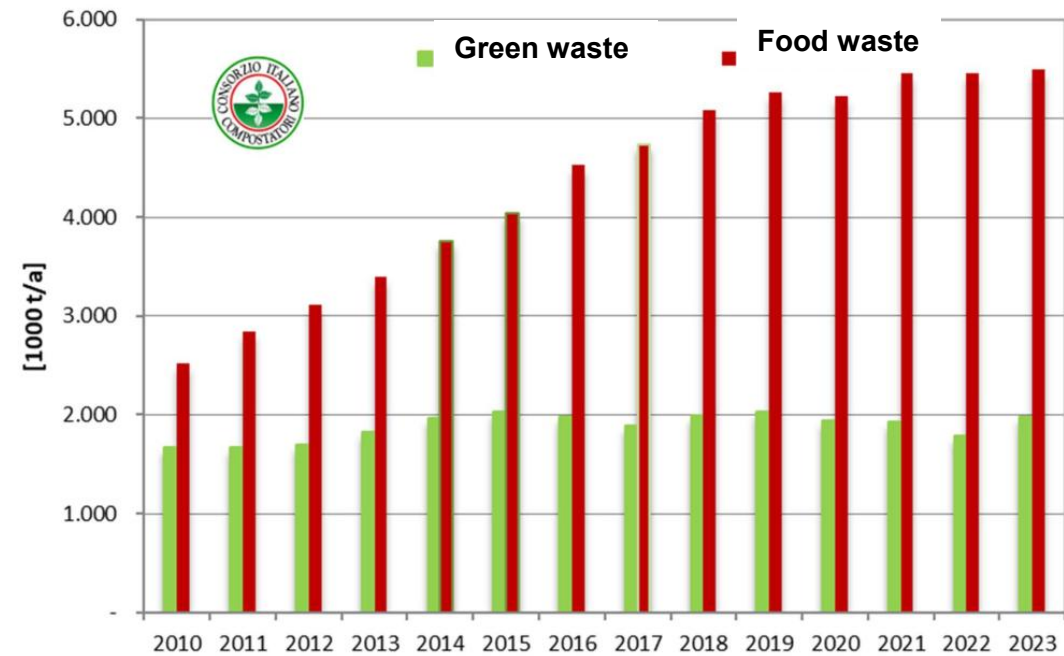
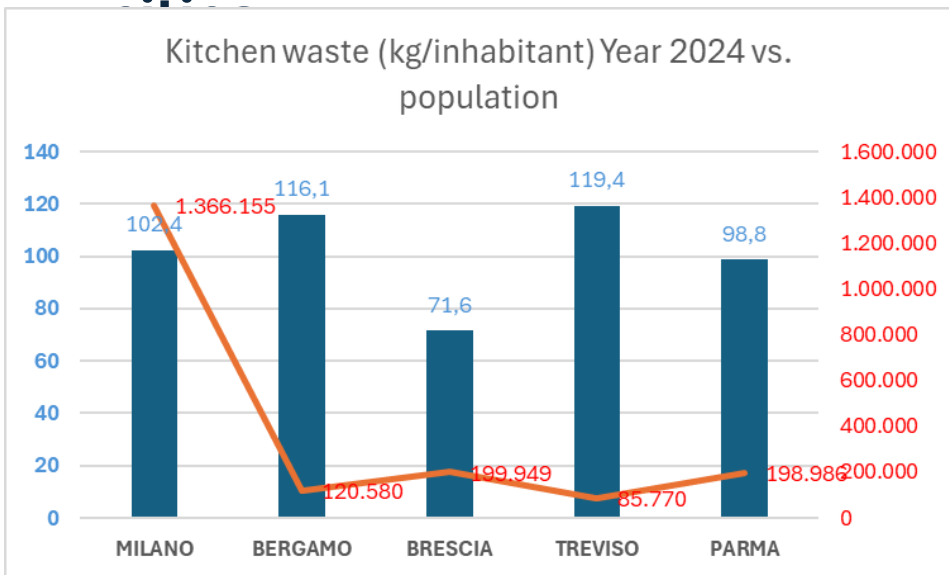
- **Disseminating best practices**
- **Keeping confident**
 - It may be done in all conditions
- **Regulatory drivers**
 - Supplementing the obligation with legally binding targets
- **Rely on frontrunners**
- **Nudging campaigns**

- **Best practice: Italy**



Italy, key data

- **60,000,000 inhabitants**
- **7,66 Mt biowaste collected (130 kg/capita)**
 - 5,6 Mt food waste (95 kg/capita)
 - 2,1 Mt garden waste (35 kg/capita)
- **> 5,000 municipalities collecting more than 60 kg/capita kitchen waste**
- **Best practices even in large**



CirBioWaste

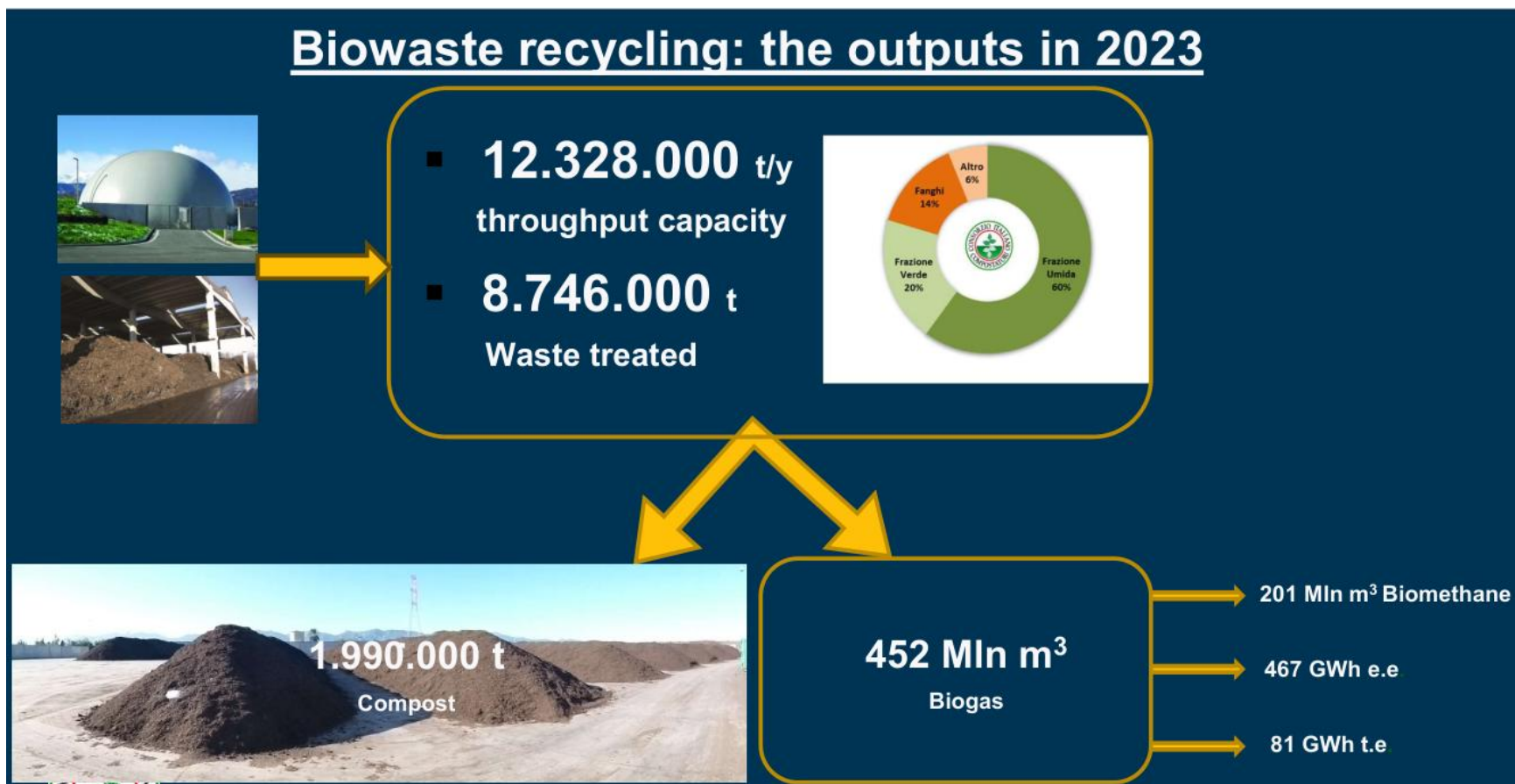


Co-funded by the European Union



Italy, key data

- 2 Mt compost produced
- 452 Mm³ biogas



Source: CIC, www.compost.it



CirBioWaste

Interreg
Euro-MED

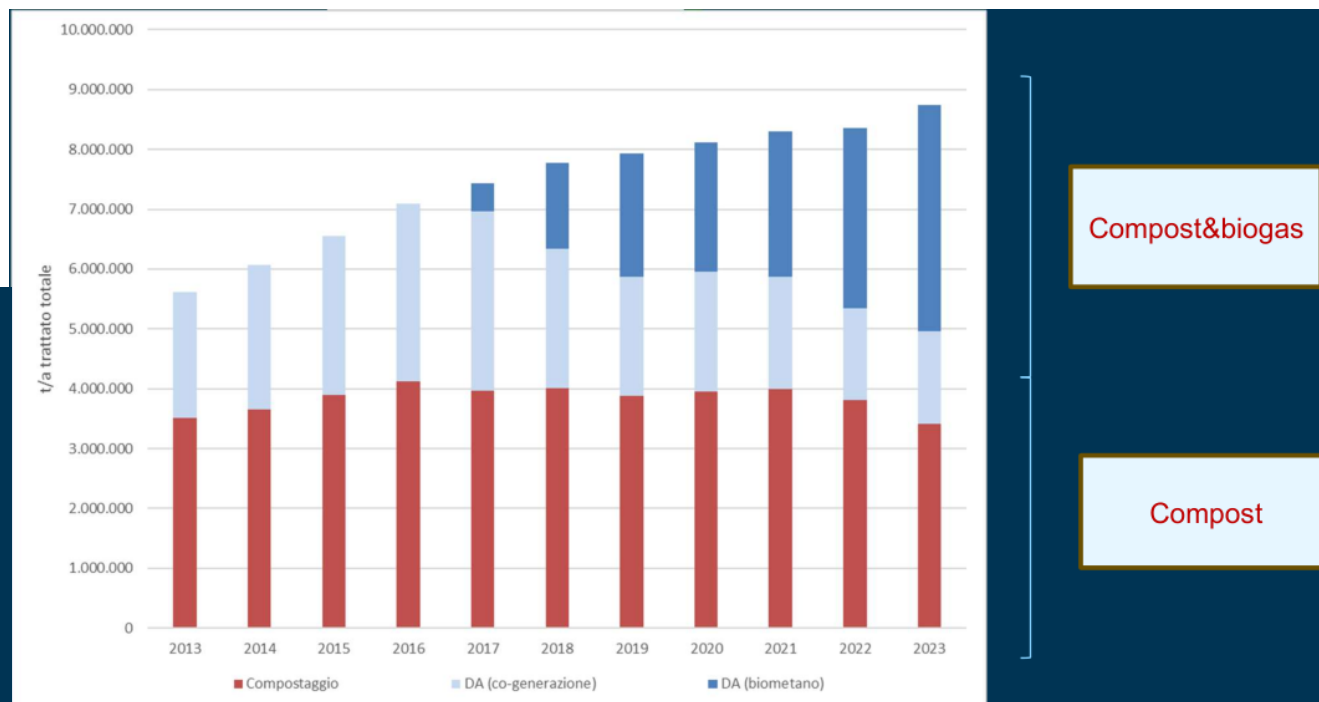


Co-funded by
the European Union

Italy, Evolution of bio-waste recycling technologies



➤ **2023: 363 composting & AD plants**



Source: CIC, www.compost.it



CirBioWaste



Co-funded by the European Union



Example of guidelines: LIFE BIOBEST

LIFE BIOBEST project

- **D3.1** Guideline on separate collection
- **D3.2** Guideline on governance and economic incentives
- **D3.3** Guideline on quality compost and digestate
- **D3.4** Factsheets on the analysis of best practices in communication and engagement from various countries
- **Summary of the guidelines** WP3 Set of guidelines
- **D5.3** Proposal for quality standards for bio-waste entering biological recycling facilities
- **D5.4** Comprehensive guidance for the EU



<https://www.youtube.com/watch?v=90t-40opzlo>



<https://zerowasteurope.eu/library/comprehensive-guidance-for-effective-bio-waste-management-in-the-eu/>



CirBioWaste

Interreg
Euro-MED



Co-funded by
the European Union



Large cities?

- Milan, Parma, Ljubljana, Copenhagen, Bristol, Barcelona
- Milan (pop. 1,4M and 800k commuters) capturing 87,5% of organics
- Around 10% (and less) organics in residual waste



Milan

103 kg/ca
5% impurities

- Residential food waste collection implemented in 2012-2014.
- Results (2017): **103 kg/capita**, ≈30 commercial, 70 residential (source: AMSA 2018).
- Very good quality: 5% impurities
- 2->1/week residual, 2/week FW



[Info: Link](#)



CirBioWaste



Co-funded by
the European Union



EU Policy: bio-waste in the WFD



Source: LIFE BIOBEST



CirBioWaste



Co-funded by the European Union



Biowaste strategies in EU Countries: obligation, targets

➤ **Mandatory separate collection**

- Germany (2015)
- Netherlands (1995)
- Italy (2021)
- Catalonia (Spain)
- ...many more aligning (art 22 WFD)

➤ **Targets**

- Recycling targets
- Biowaste targets (Sweden)



EU Policy: bio-waste in the EU Waste Framework Directive (WFD)



Priority Topic	WFD reference
Separate collection	Member States shall collect bio-waste separately by 31 December 2023 (Article 22 (1)).
	Derogations for environmental, technical, and economic reasons are included in the text (Article 10 (3)).
	By 31 December 2021, Member States shall submit a report to the Commission on the implementation of Article 10 as regards bio-waste, including on the material and territorial coverage of separate collection and any derogations under paragraph 3 (Article 10 (6)).
Bio-waste not separated at origin	As of 1 January 2027, municipal bio-waste entering aerobic or anaerobic treatment may only be counted as recycled if it has been separately collected or separated at source (Article 11a (4)) - MBT will no longer count towards recycling targets.
Recycling targets	by 2025, the preparing for re-use and the recycling of municipal waste shall be increased to a minimum of 55 % by weight; by 2030, the preparing for re-use and the recycling of municipal waste shall be increased to a minimum of 60 % by weight; by 2035, the preparing for re-use and the recycling of municipal waste shall be increased to a minimum of 65 % by weight. (Article 10).
Calculation of recycling targets	The amount of municipal biodegradable waste that enters aerobic or anaerobic treatment may be counted as recycled where that treatment generates compost, digestate, or other output with similar quantity of recycled content in relation to input, which is to be used as a recycled product, material or substance. Where the output is used on land, it may only be considered as recycled if resulting in agriculture or ecological improvement (Article 11a (4)). End-of-waste materials to be used as fuels or other means to generate energy, be incinerated, backfilled or landfilled, cannot be counted towards the recycling targets (Article 11a (5)). Implementing acts establishing rules for the calculation, verification and reporting of data, in particular as regards bio-waste separated and recycled at source shall be adopted by 31 March 2019 (Article 11a (9)).
Inputs into final recycling process	The Commission will monitor national criteria and will, when necessary, adopt implementing acts that specify the permissible waste inputs for the recovery operation (Article 6 (2a)).
Specific recycling target for bio-waste	By 31 December 2024 the Commission shall consider the setting of recycling targets for municipal bio-waste (Article 11 (6)).
Collection target for industrial bio-waste	By 31 December 2024, the Commission shall consider the setting of recycling targets for commercial waste and non-hazardous industrial waste (including bio-waste) (Article 11 (6)).
Incentive schemes dedicated to bio-waste	Member States shall make use of economic instruments and other measures to provide incentives for the application of the waste hierarchy such as those indicated in Annex IV or other appropriate instruments and measures (Article 4 (3)).
	Member States will promote the use of materials produced from bio-waste (Article 22 (2c)).
biodegradable or compostable bioplastics	Member States may allow waste with similar biodegradability and compostability properties to be collected together with bio-waste if it complies with European or equivalent national standards (Article 22 (1)).
Standard for organic recycling	Mandate for the development of a European standard for bio-waste entering organic recycling processes (Article 22 (3)) (not yet available).
Home composting	Member States shall encourage home composting (Article 22 (2b)).
Food waste reduction	An indicative Union-wide food waste reduction target of 30% by 2025 and 50% by 2030 is included (Recital 12).
Non incineration of bio-waste	Bio-waste shall not be incinerated (Article 10 (4)).

Source: ECN and LIFE BIOBEST, adapted

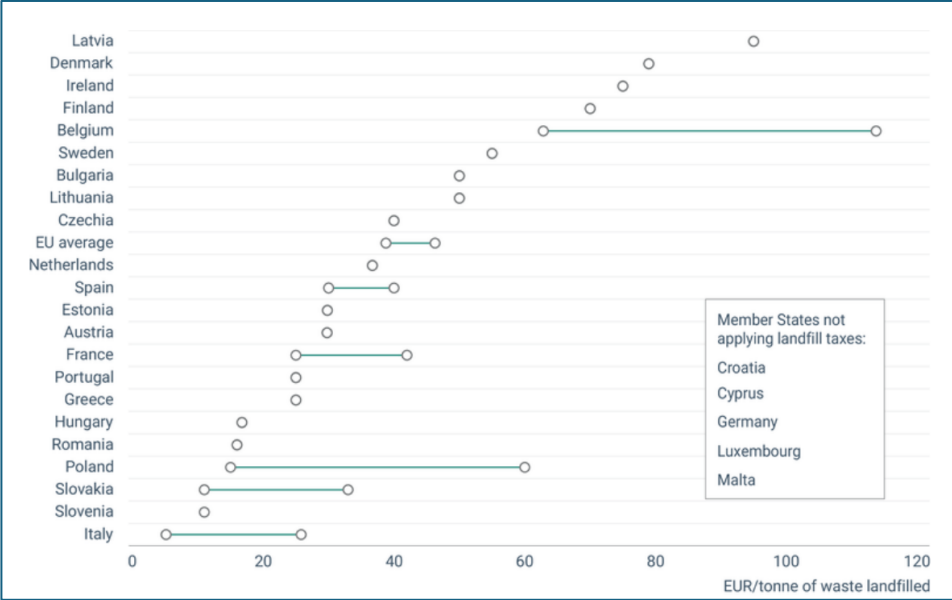
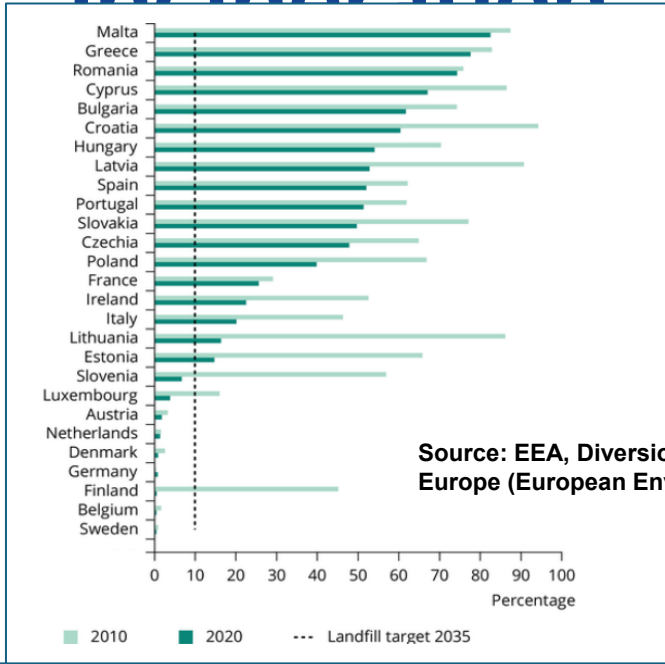


CirBioWaste

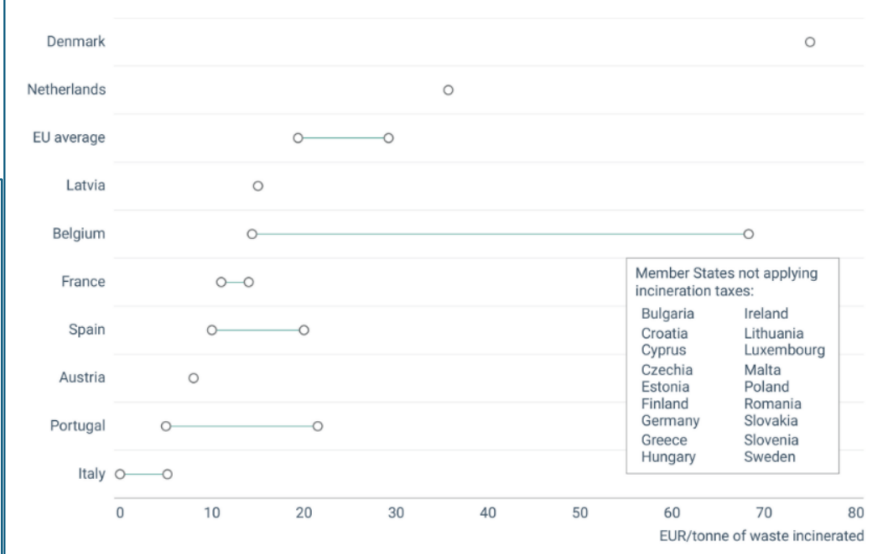
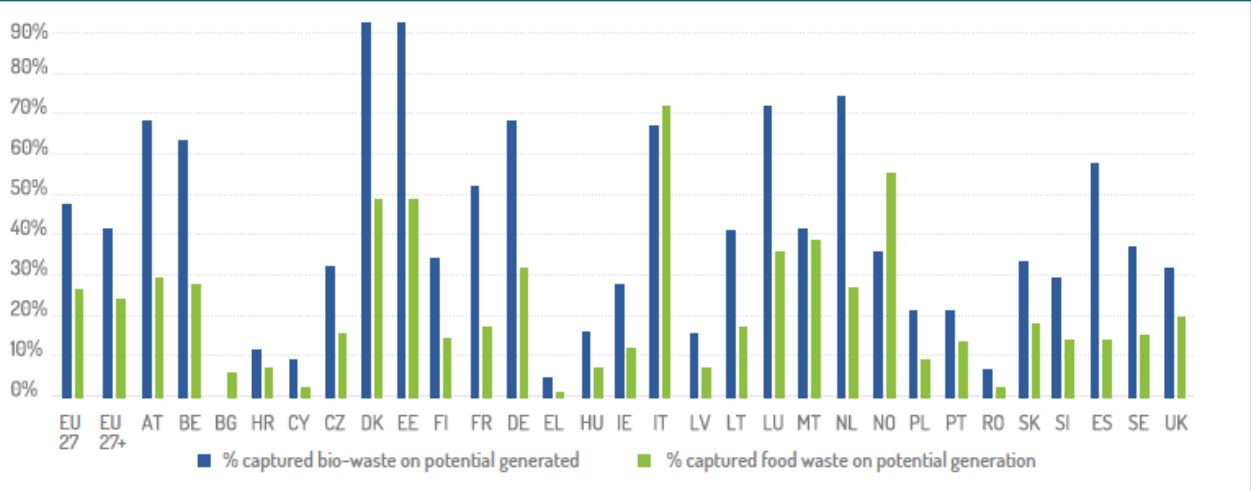


Co-funded by the European Union

Bio-waste: do not send to landfill or incineration



Overview of landfill taxes on municipal waste used in EU Member States, 2023 (source EEA)



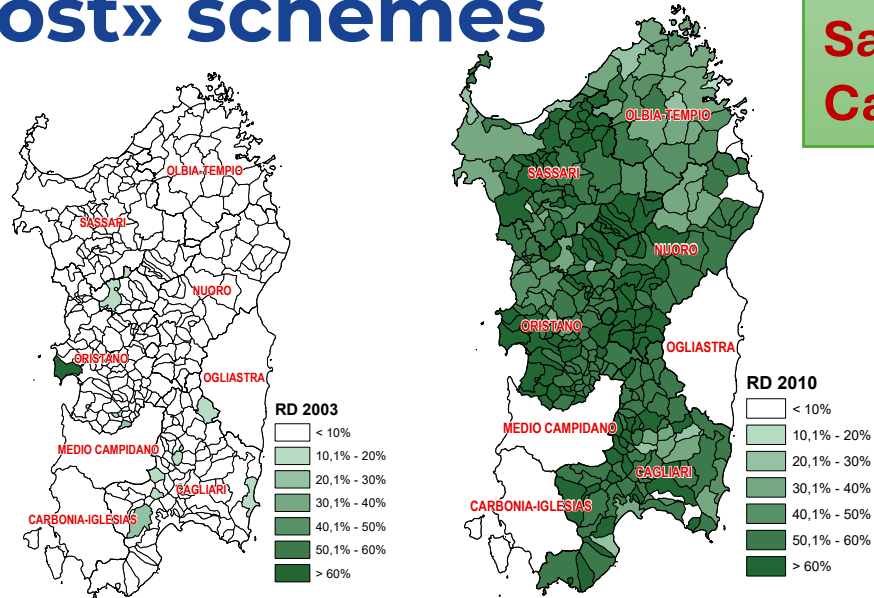
Overview of taxes on the incineration of municipal waste in EU MS, 2023 (source EEA)

Incentives: «zero cost» schemes

**Case studies:
Sardinia,
Catalonia**

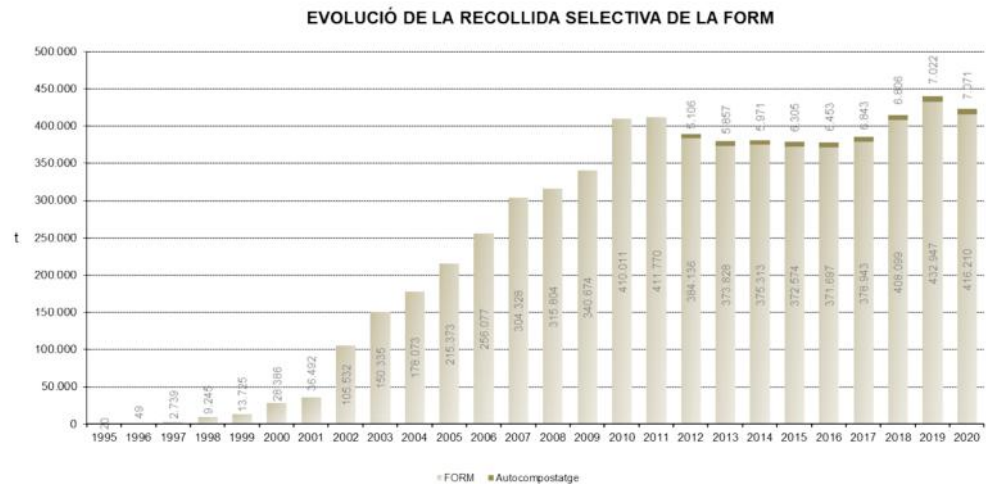


➤ **Sardinia, Catalonia:
Landfill / Incineration
tax returned to
municipalities
according to their
performance in
separate collection of
biowaste**

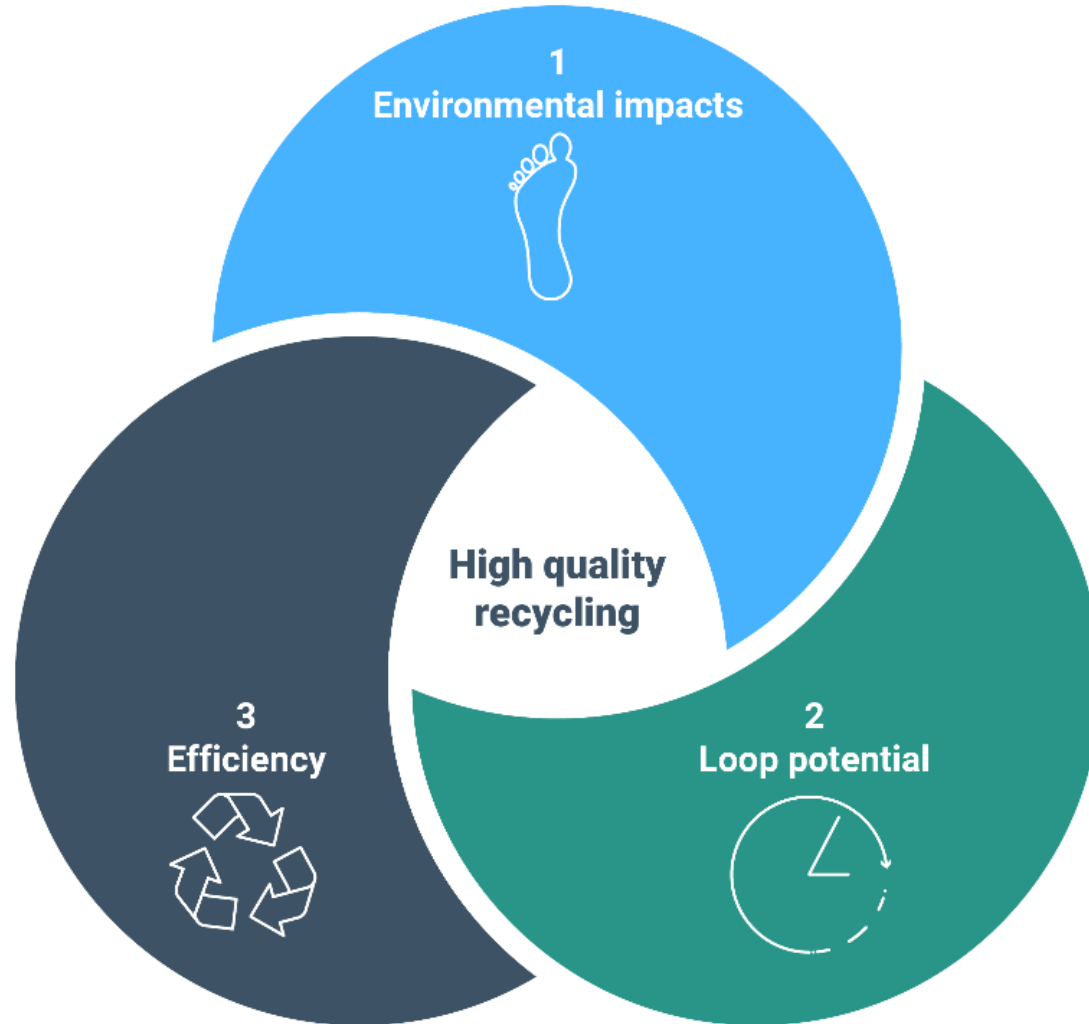


**SARDINIA Food waste
collected (tonnes):
2003 = 2.800
2012 = 160.000**

**CATALONIA Food waste
collected (tonnes):
2001=36.000
2010=410.000**



Quality recycling



3 pillars of quality recycling. EEA.
<https://www.eea.europa.eu/en/analysis/publications/measuring-the-quality-of-recycling>

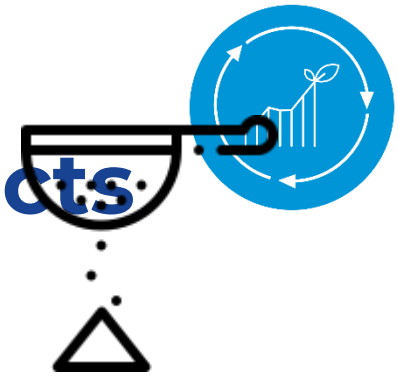


CirBioWaste



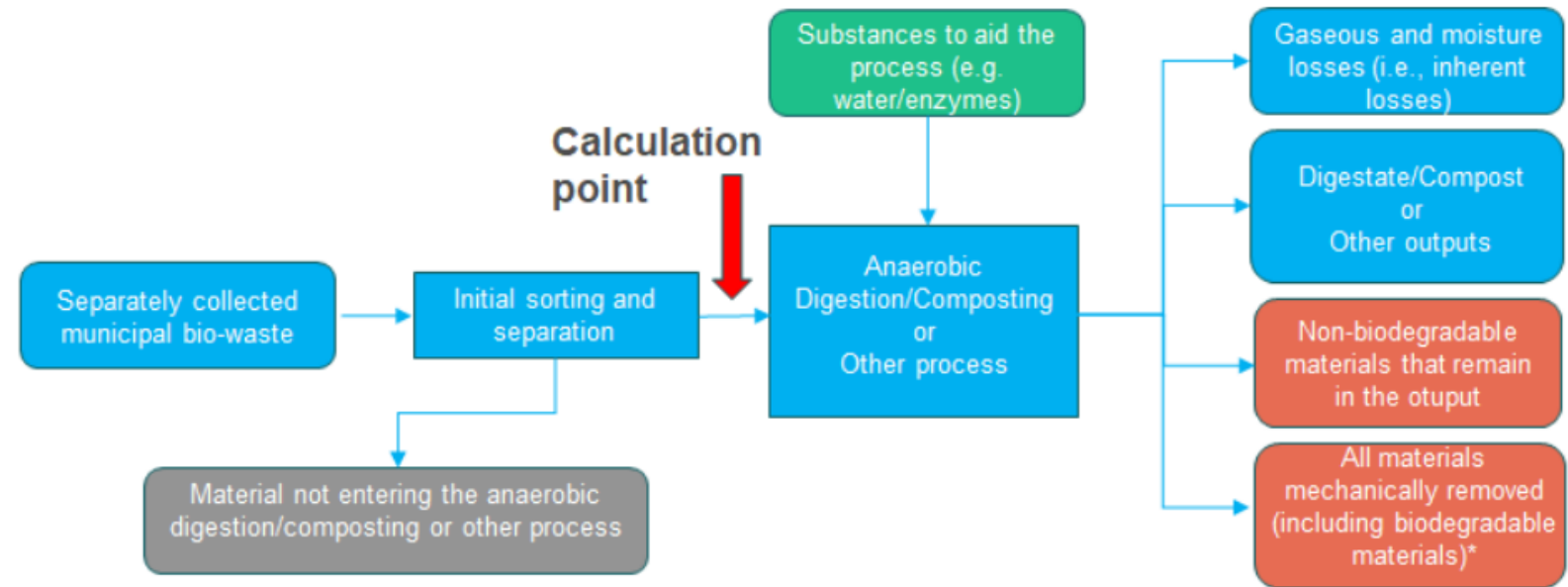
Co-funded by the European Union

Recycling calculation point : subtract rejects



➤ From recycling calculation, must be subtracted:

- Impurities in bio-waste **collected**
- Impurities removed in bio-waste **treatment**



* This includes only the materials sent for disposal or energy recovery. It does not include the materials that are recirculated into the next batch



Biowaste collection methods Comparisons from Catalonia



Biowaste Separate collection in Catalonia – Quantity & quality

Door to Door



Model	kg bioR/year	g bioR/day
Road containers (RC)	42	114,5
Mixt (RC & DtD)	68,5	188
Door to Door (DtD)	112	306
AVERAGE	47	128

Source: ARC
Data 2020

Road
containers



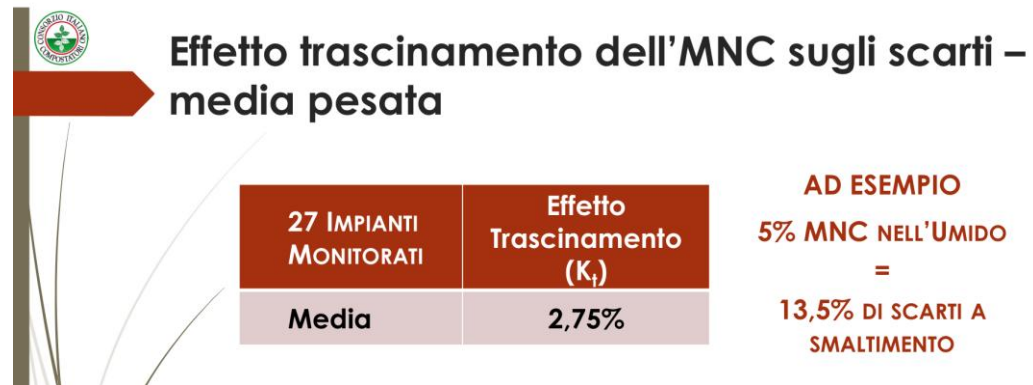
Model	% impurities
Road containers (RC)	13,48 %
Door to Door (DtD)	4,68 %
AVERAGE	12%

1.805 samples/year
Characterisation
annual campaign

Kitchen waste: dragging effect



- Each % point of impurity in the collection phase generates on average 2.75 % points in the treatment phase (source CIC, 2024)



Dati CIC 2022, progetto COREPLA

Porta a porta:

MNC 4,7% -> trascinamento 12,9%

Cassonetti ad accesso controllato:

MNC 7,9% -> trascinamento 21,7 % -> se la FORSU è il 30% dei rifiuti raccolti – **stiamo sottraendo 6,5 punti % di raccolta differenziata a causa dell'effetto trascinamento**



CirBioWaste

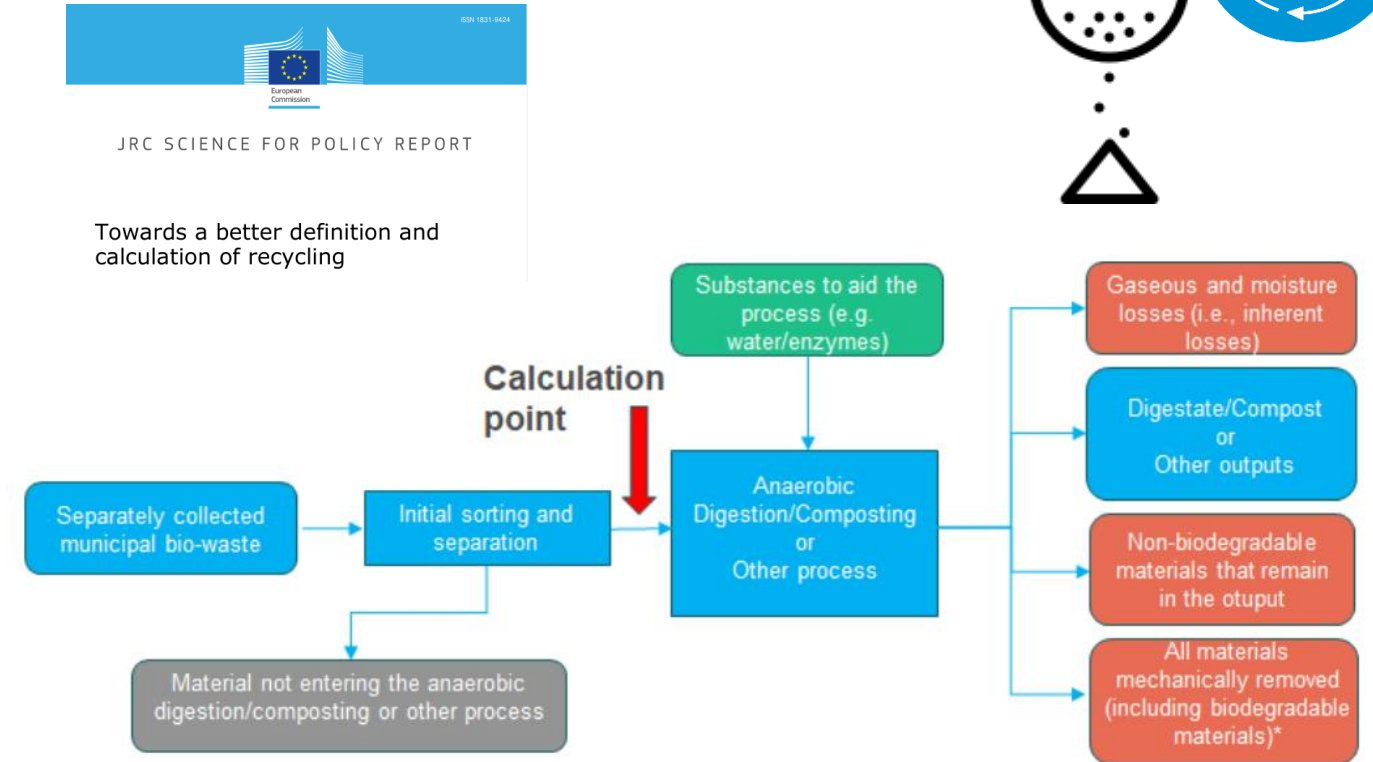


Co-funded by the European Union

Bio-waste calculation point and new treatment technologies

➤ Not calculated as recycled:

- If it's not composting or anaerobic digestion: (e.g. new treatment technologies: pyrolysis, biochar..., biochar...) the gaseous and moisture losses must be removed from the calculation
- *Output: very low amount of output compared with the benchmark of composting and anaerobic digestion processes*



* This includes only the materials sent for disposal or energy recovery. It does not include the materials that are recirculated into the next batch

Figure 11: Calculation point and calculation rules for bio-waste process generates very low amount of output compared with the benchmark of composting and anaerobic digestion processes. As for the

*When the process generates very low amount of output compared with the benchmark of composting and anaerobic digestion processes, and under the condition that this output is used as recycled product, material or substance, **Inherent losses are considered as process losses instead of accounting as recycled material** (see Figure 11).*





CirBioWaste

Interreg
Euro-MED



Co-funded by
the European Union

Thank you!

Michele Giavini

Consorzio Italiano Compostatori

giavini@compost.it

<https://cirbiowaste.interreg-euro-med.eu>

Follow our project on:

