



The best way to optimize  
bio-waste collection in my  
city

15th November 2022

## 25 YEARS OF BIOWASTE MANAGEMENT IN CATALONIA. PAST, PRESENT AND FUTURE

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# Learning from Germany, Austria, Italy



**Witzenhausen**  
**Aßlar**  
**Homburg**  
**Vienna**  
**Monza**  
**Milano**  
**Torino**  
**Parma,...**





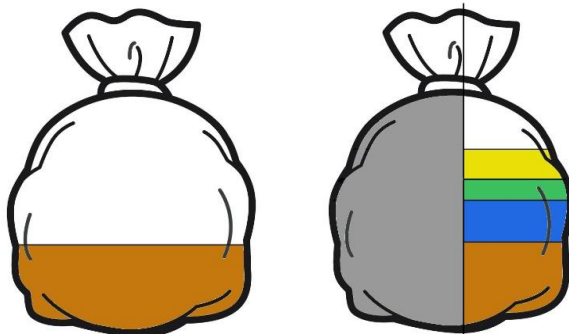
# Answering the main questions

## Why?

- **Legal reasons**
  - **Catalan Law on Waste (1993)**
    - Biowaste Separate Collection COMPULSORY
    - Planning High Efficiency Separate Collection
  - **Waste Directive (2008/2018)**
    - MW Recycling Targets (50%>**55%**>**60%**>**65%**)
    - Biowaste Separate Collection COMPULSORY (2024)
- **Environmental reasons**
  - Efficient use of resources
  - Fighting against climate change
  - Promoting renewable energies
  - Improving soil fertility & protection
- **Economic reasons**
  - Environmental Taxation

## What?

- **Biowaste (typology)**
  - Leftovers from food and food preparation, plant and animal origin, fresh or cooked (32%)
  - Green waste (4%)
- **Characteristics of Biowaste**
- **Amount of Biowaste (36%)**
  - Potential ~1,200,000 T/year
  - Distribution between Separate Collection of Biowaste & Residual Waste



## Who?

- **Biowaste Producers:**
  - **Households** (Homes, Apartments, etc.)
  - **Commercial activities** (can generate between 25% to 40% of the overall biowaste):
    - Commercial establishments: supermarkets, markets, shops, etc.)
    - HORECA (hotels, bars, restaurants, canteens, etc.)
    - Other activities that have community canteens (schools, hospitals, nursing homes, factories, etc.)
- **Seasonality of the generation**
  - Down
  - High (associated with tourism)

# Answering the main questions

## How?

- **Separation at source**

- Using compostable bags (EN-13432) and ventilated bucket [aerated system]
- Prevention
- Reduces problems: odours, flies, leachates, ...
- Comfortable for users
- Higher quality of biowaste



## How?

## When?

- **Separate Collection**

- Thorough **Road Containers**
  - Permanent (24 h x 365 d) or temporary (put in/take out)
  - Limitations / Closure



- **Door to Door**

- 2/3 times/week



## Where?

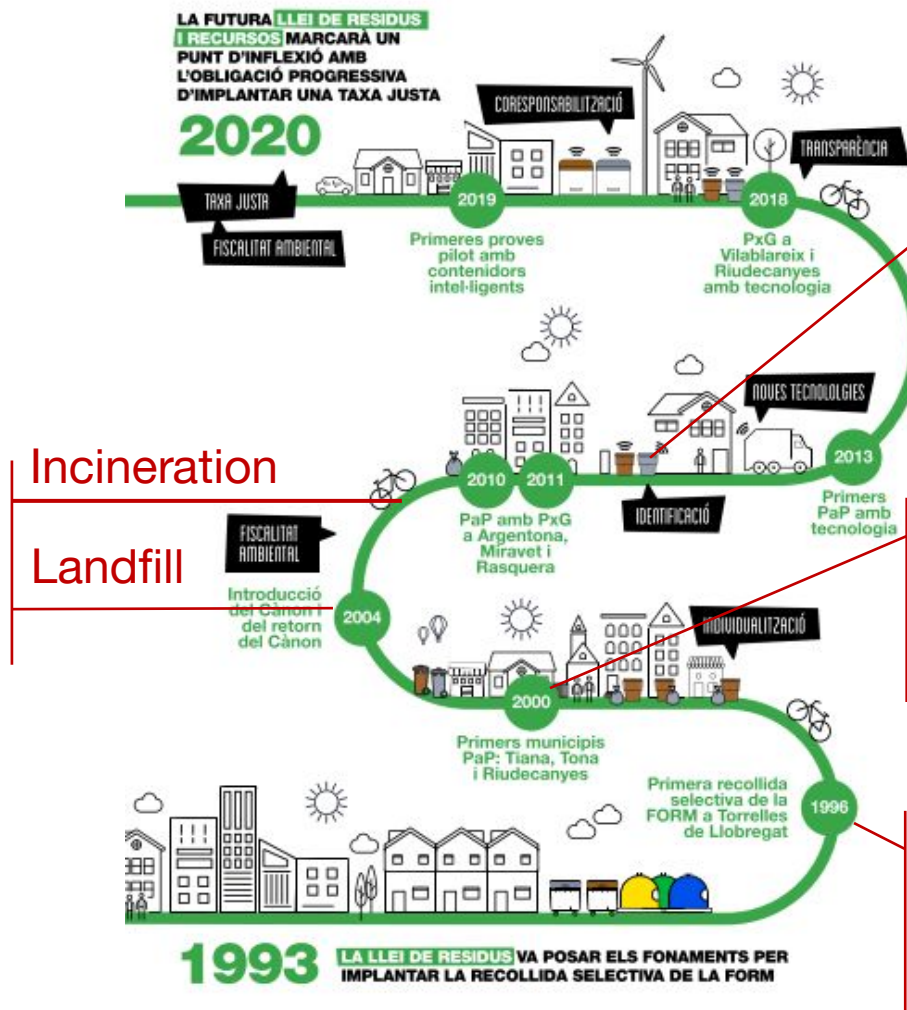
- **Biological treatment**

- **Composting [C]**
  - Home-composting
  - Community Composting
  - Composting plants
- **Anaerobic Digestion [AD]**
- **Combined systems [AD+C]**
- Facilities with:
  - Different dimensions and technological systems



# A long journey of more than 25 years

## Environmental Taxation



**FAIR TAX  
(PAYT &  
BBP)**

**DOOR TO  
DOOR  
Collection**

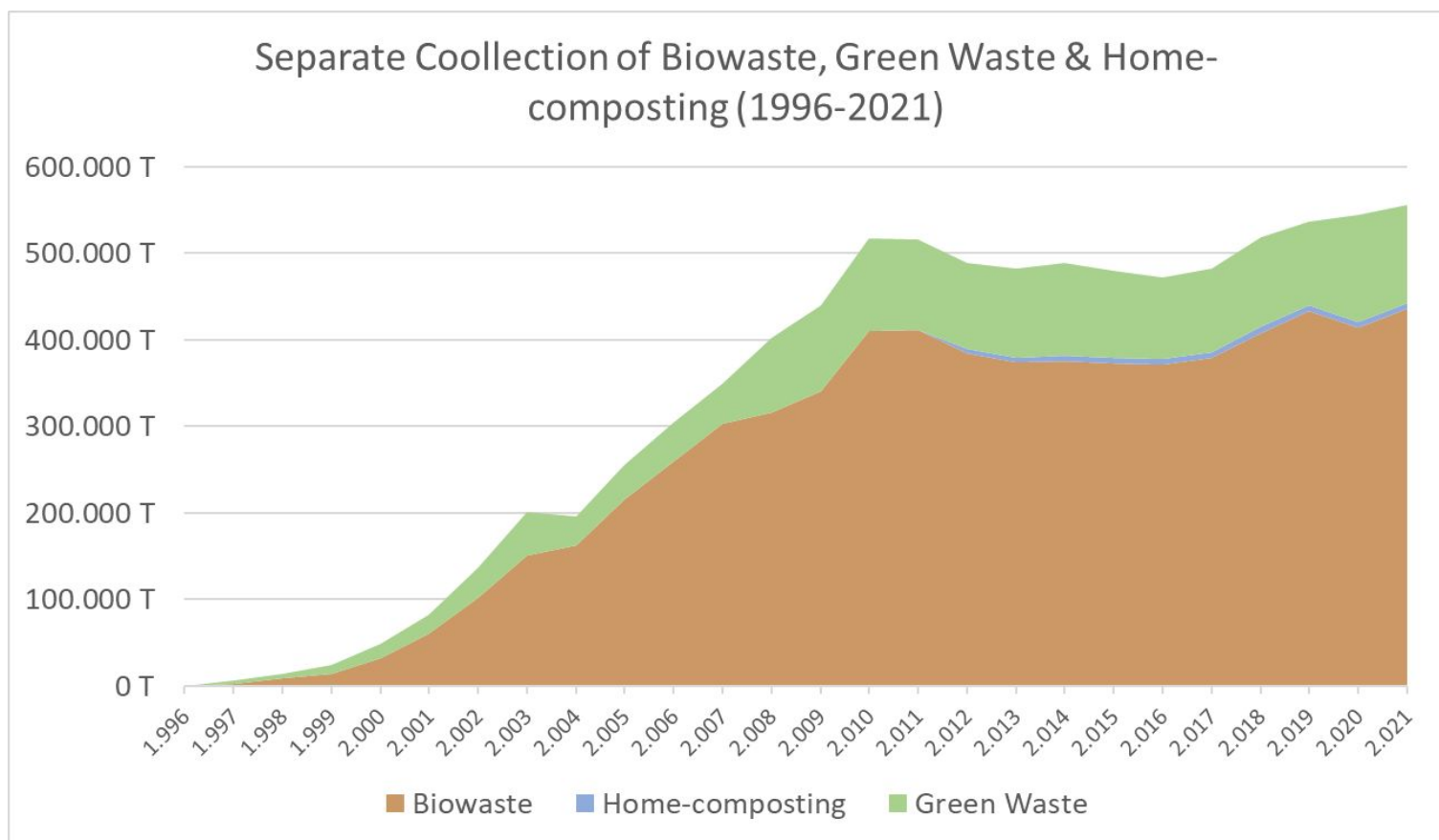
**Separate  
Collection of  
BIOWASTE**

**QUANTITY  
&  
QUALITY**

- ✓ Optimization of Separate Collection
  - ✓ technique
  - ✓ environmental
  - ✓ economic
- ✓ Co-responsibility
- ✓ User identification
- ✓ Transparency
- ✓ Fair Tax



# Balance of biowaste management along 25 years



\* 65,000 tons Home-composting

**1996-2021**

**1.8 M tons  
Green Waste**

**6.7 M tons  
Biowaste\***

**0,8 M tons  
Compost  
Class A (22%)  
Class B (76%)**

**2021**

**114,000 t  
Green Waste**

**435,000 t  
Biowaste**

**39,000 t  
Compost**

**21 M m<sup>3</sup> Biogas**

# Biowaste Quality Traceability (2005-2022)

- ~ 600 biowaste circuits (public or private)
- ~ 2,000 biowaste quality controls / year
- > 22,500 quality controls (since 2005)

The forms are titled 'Butlletí de caracterització de la FORM' and are used for biowaste characterization. They include sections for general data, waste composition, and a detailed table of waste fractions with their respective percentages.

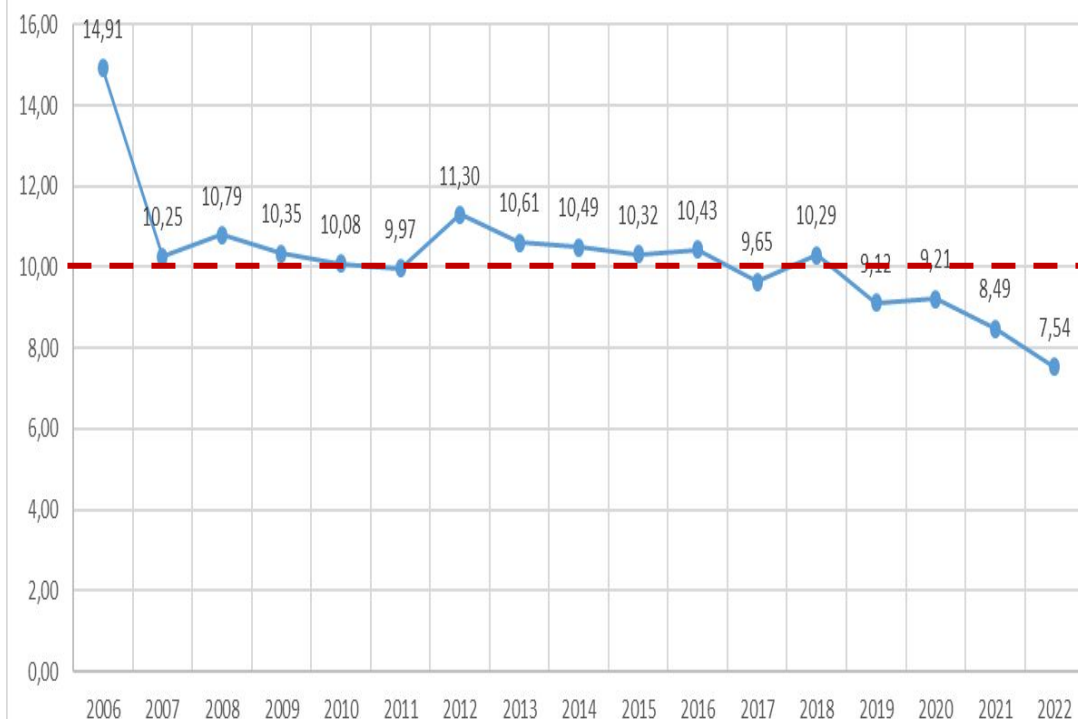


All this information is available in:

<https://sdr.arc.cat/cform/ListCaracteritzacions.d>

# Biowaste Quality Traceability (2005-2022)

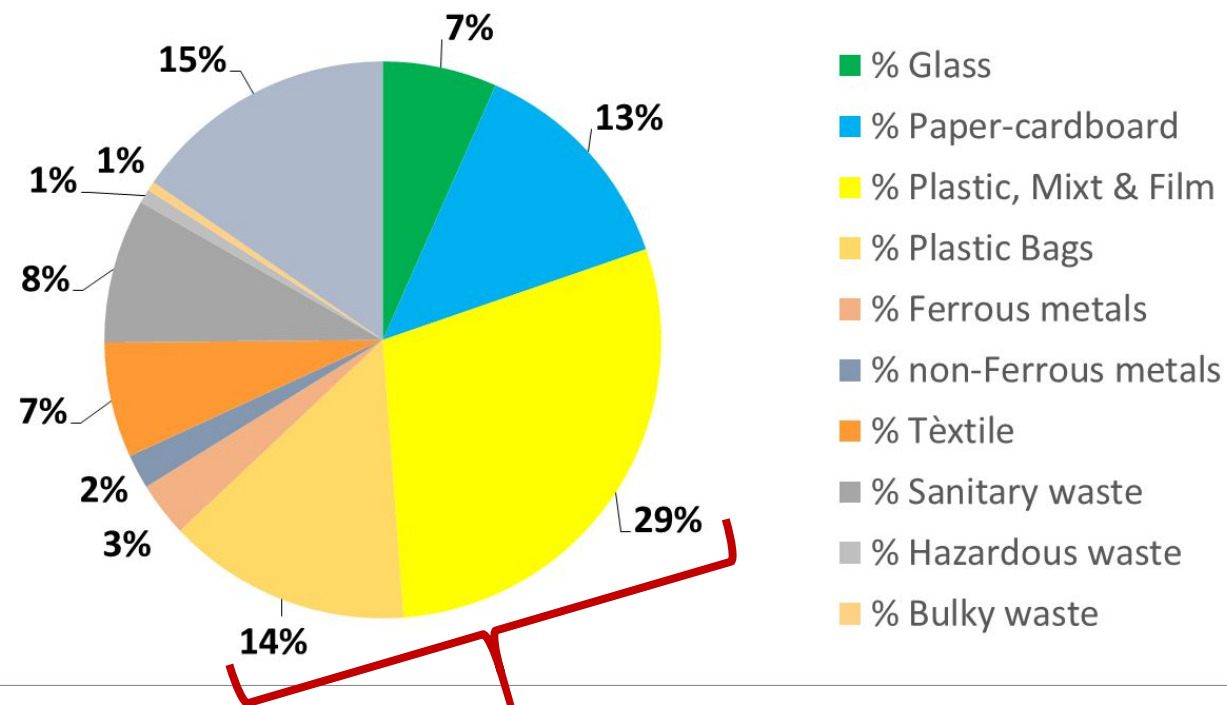
Evolution of biowaste quality (average impurities) (in %) 2006-2022



--- Target: < 10 %  
impurities

**Average Impurities (2021): 8.5 %**

Average of Impurities in Biowaste. 2006-2022 (n=22.500)

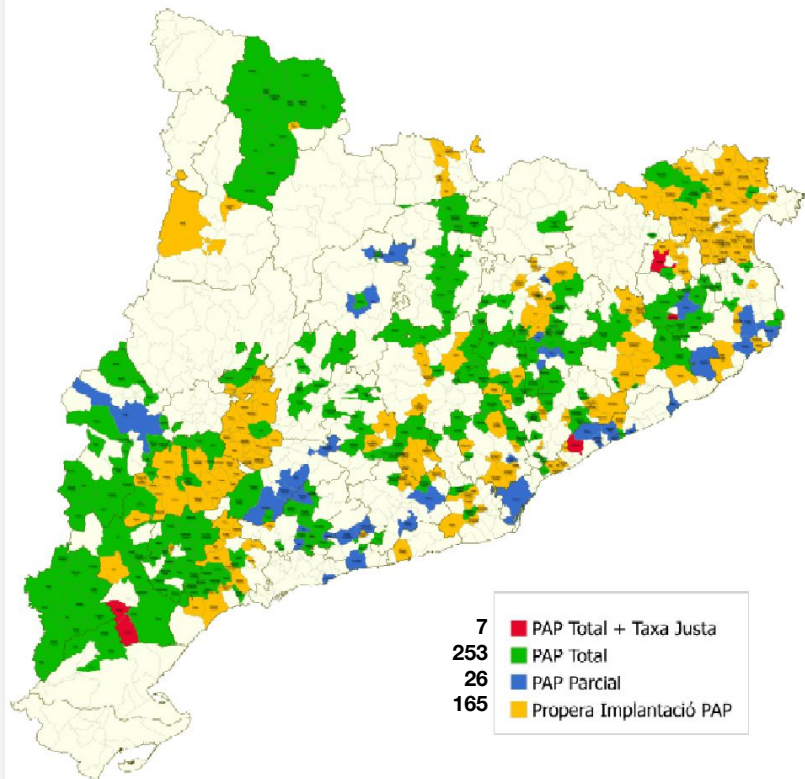


**43% PLASTIC**



# Contribution of Door-to-Door collection in Catalonia

Implantació de la Recollida Selectiva Porta a Porta a Catalunya. Maig 2022

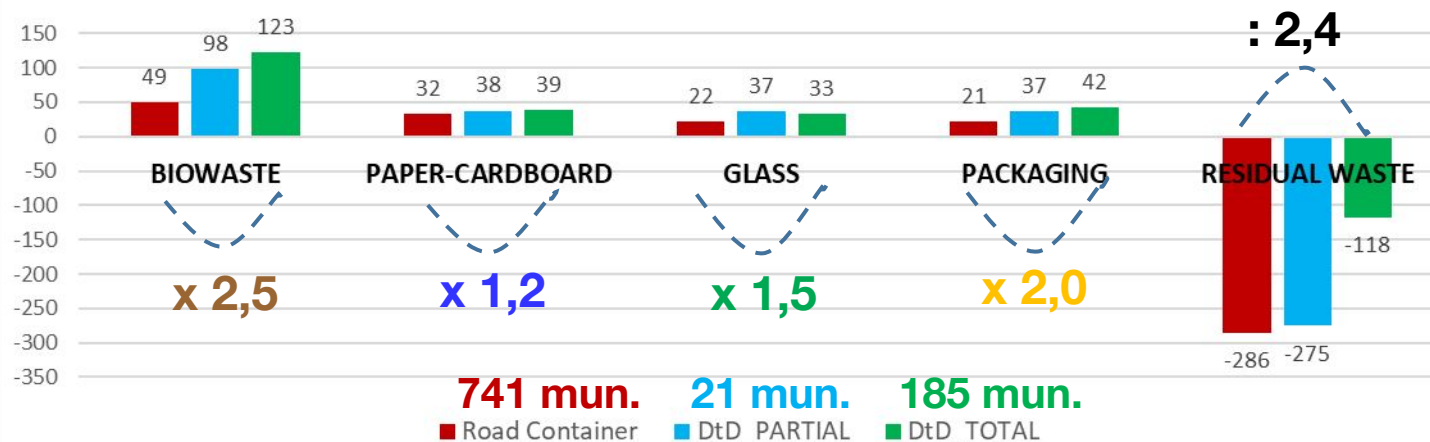


**302 municipalities (32%)**

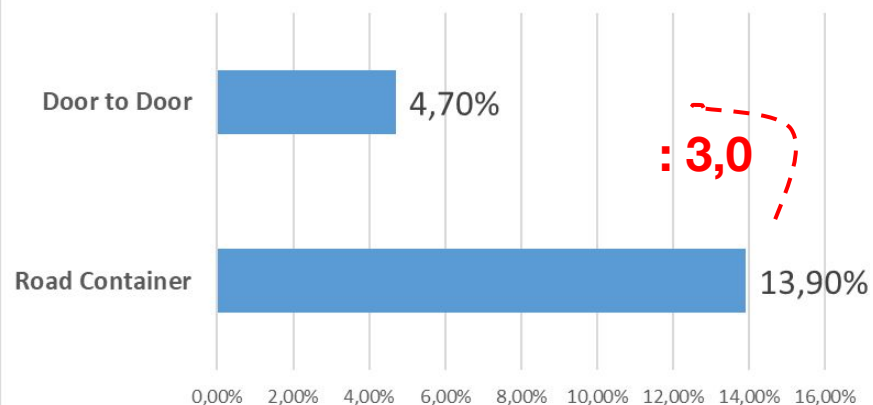
**~452 municipalities in future (48%)**

**840.000 inhabitants involved (11%)**

Performances of Separate Collection (per fractions & SC System)  
Year 2020 (Kg/inhab·yr)



Biowaste Quality ( % impurities) [2020]



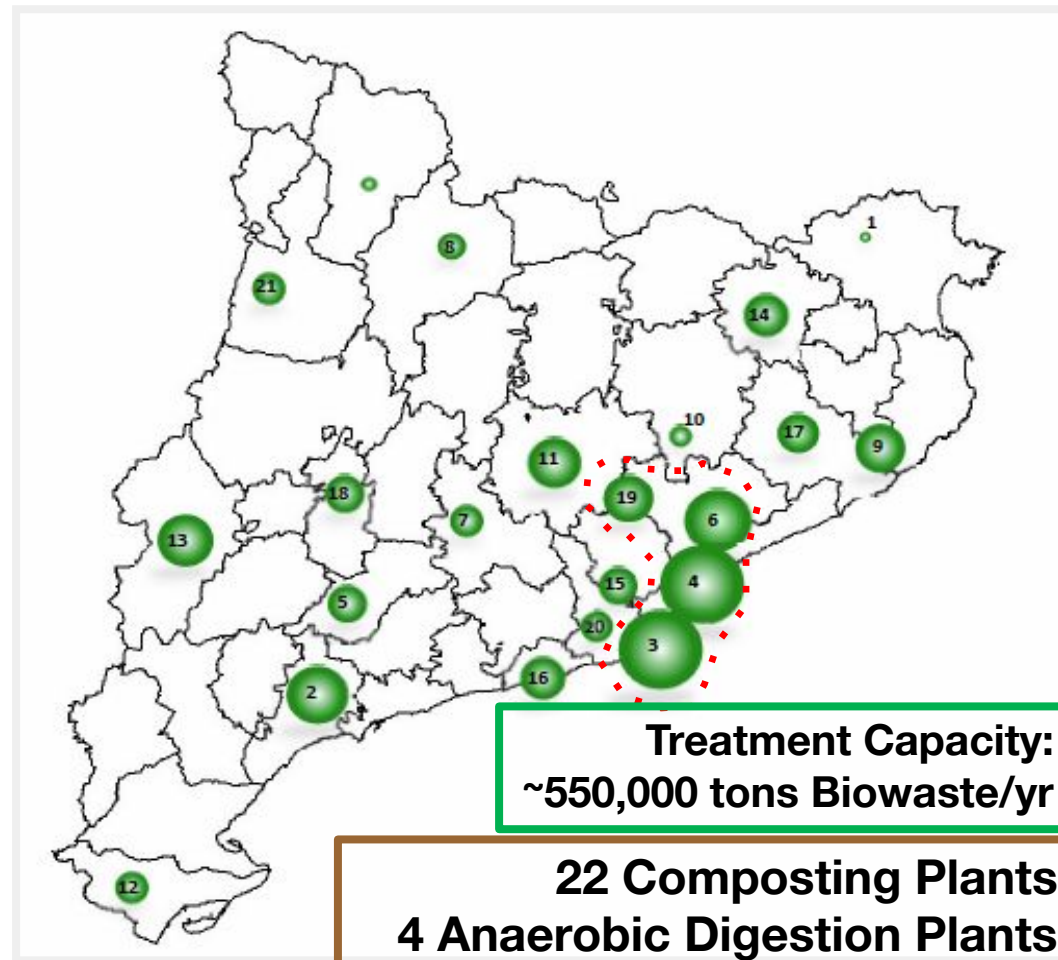
## Separate Collection of Biowaste

- Practically all the municipalities in Catalonia have implemented the separate collection of bio-waste.
- The biowaste separate collection service covers 95% of the population and the rest of the population, 5%, has access to home-composting.

- 465 municipalities manage their biowaste

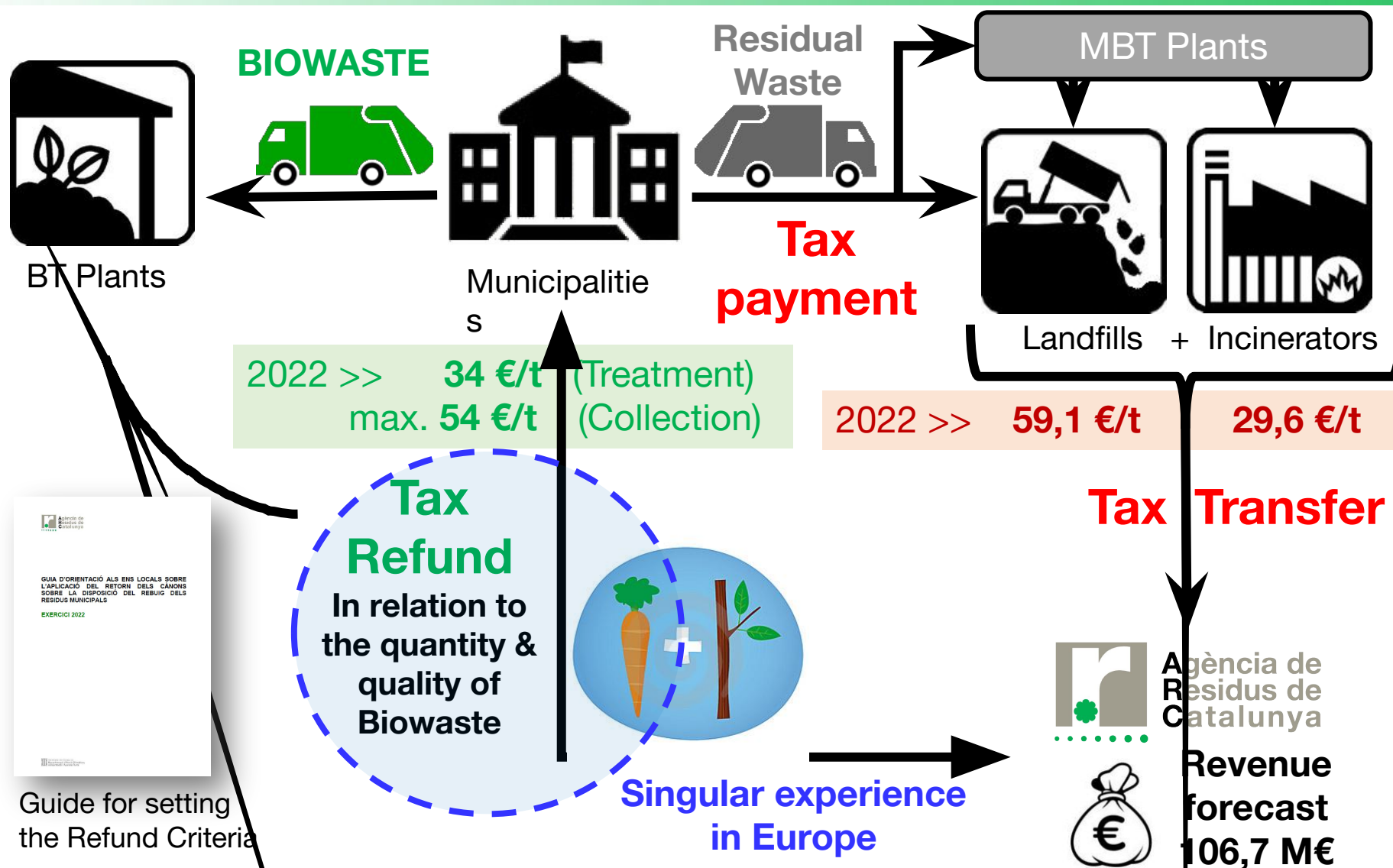
COMPOSTING		Number of Municipalities	Númer of Composters	
	Separate Collection			
Home Composting	Complementary use	303	21,201	28,074
	Exclusive use	166	6,873	
Community Composting	Complementary use	95	413	926
	Exclusive use	95	513	
		465	29,000	

## Biological Treatment of Biowaste





# Environmental Taxation on waste



## LANDFILL

Average Fee: 52,0 €/T  
 Tax 2022: 59,1 €/T  
**TOTAL = 111,1 €/T**

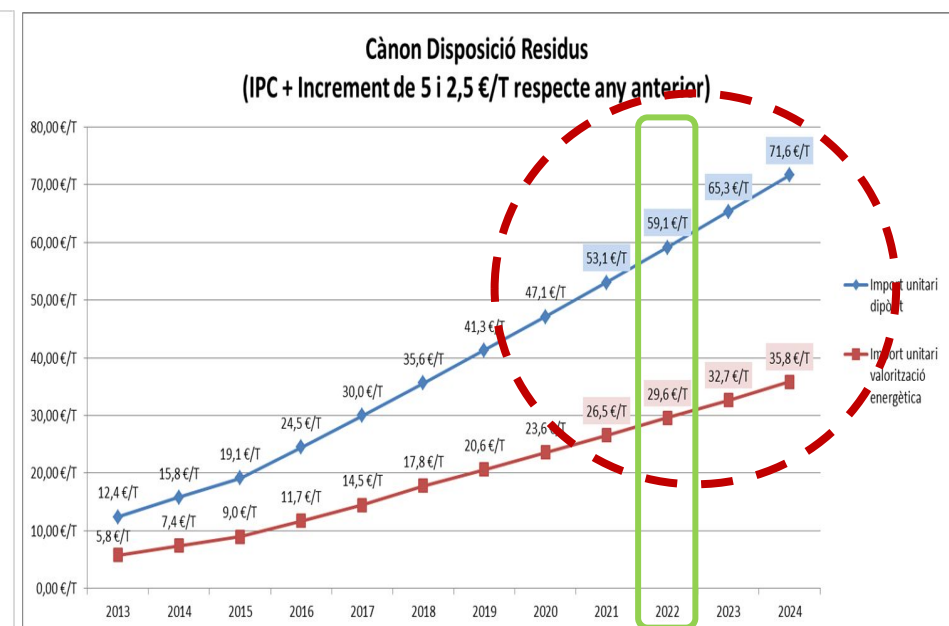
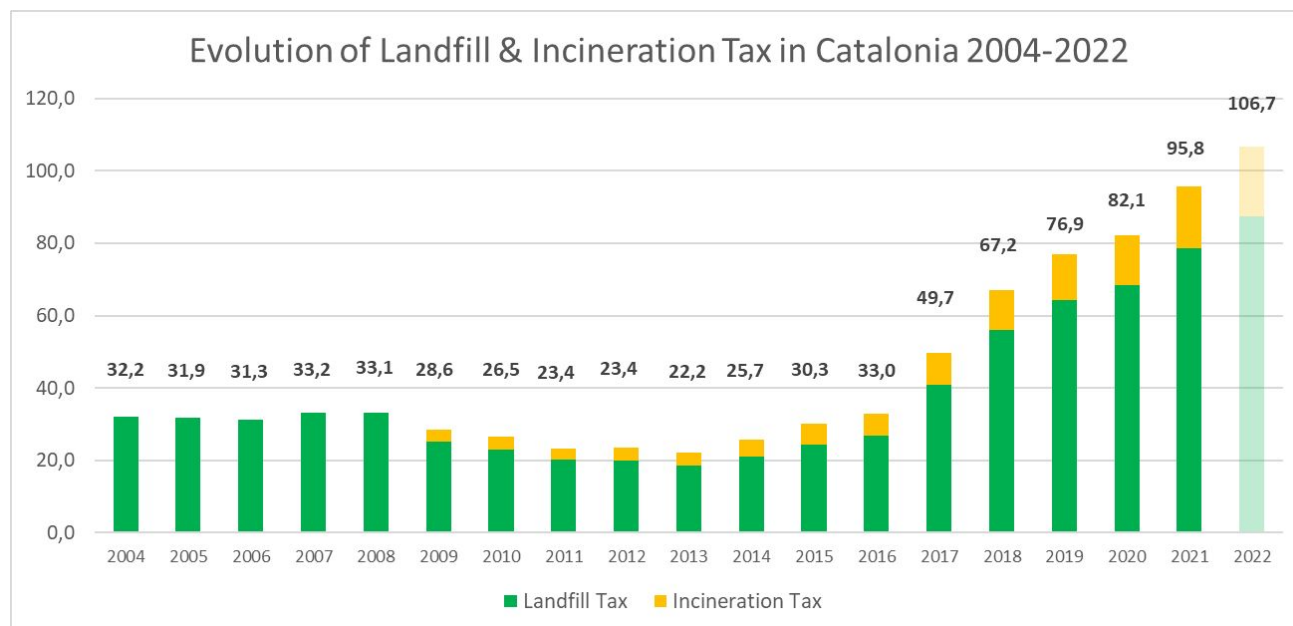
## Incinerator

Average Fee: 70,0 €/T  
 Tax 2022: 29,6 €/T  
**TOTAL = 99,6 €/T**

**In 2035, in order to achieve EU targets, the overall charge (fee + tax) to enter the landfill should reach between €130/T and €150/T**

# Environmental Taxation on waste

Tax Rate (€/T)	2004-2008	2009	2010	2011	2012-2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
LANDFILL TAX	10	10	10	12	12,4	15,8	19,1	19,1	30	35,6	41,3	47,1	53,1	59,1
INCINERATOR TAX	---	5	5	5,5	5,7	7,4	9	9	14,5	17,8	20,6	23,6	26,5	29,6



**Overall revenue 2004-2022: 853 M €**

**Overall refunded Tax 2004-2022: 819 M€ (96%)**

**Expected  
TAX  
increases**



# Future challenges for biowaste management

## Challenge-1

Advance in "efficient" separate collection systems in large cities and in municipalities with high density in order to achieve the European targets



## Challenge-2

Keep improving the quality of biowaste, always promoting the separate collection with a compostable bag, and achieving less than 5% of impurities



## Challenge-3

Increase in 10 years the biological treatment capacity by around 400,000 tons of biowaste, with a vision of decentralized management and km 0

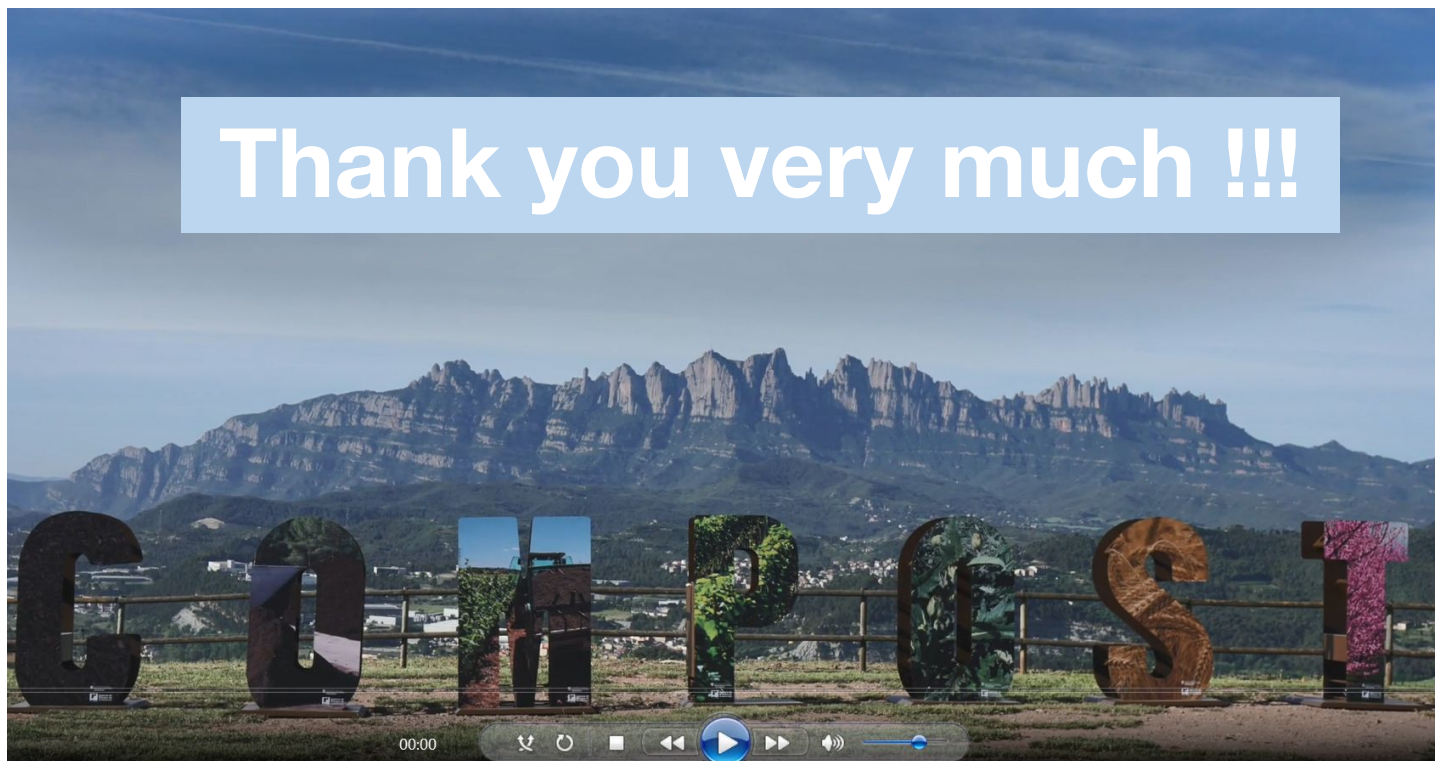


## Challenge-4

Facing the appearance of biodegradable / compostable materials and products (packaging or not) in the collection and treatment of biowaste



Thank you very much !!!



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<https://www.youtube.com/user/residuscat/video>

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