



Separate collection of biowaste – is it technically, economically and environmentally practicable?

Brussels, 6th September 2017



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Italian Composting and Biogas Association

www.compost.it

TEEP in the WFD: the evolution

- Directive 2008/98/EC
 - Art. 4: Member States shall take into account the general environmental protection principles of precaution and sustainability, **technical feasibility and economic viability**, protection of resources as well as the **overall environmental**, human health, economic and social impacts,
 - Art. 10 – 2 (see recital 28): Where necessary to comply with paragraph 1 and to facilitate or improve recovery, waste shall be collected separately **if technically, environmentally and economically practicable** and shall not be mixed with other waste or other material with different properties.
 - Art. 22 (biowaste): Member States shall take measures, as appropriate, and in accordance with Articles 4 and 13, to **encourage** (a) the separate collection of bio-waste...
 - The Commission shall carry out an **assessment** on the management of bio-waste with a view to submitting a proposal if appropriate... (also recital 35)



TEEP in the WFD: the evolution

- Withdrawn proposal 2.7.2014:
 - Art. 10 unchanged
 - Art. 22: In order to minimize contamination of waste materials, Member States shall **ensure** separate collection of bio-waste by 2025.
 - The Commission shall carry out an assessment...
- EC Proposal 2.12.2015: art. 22
 - 'Member States shall **ensure** the separate collection of bio-waste **where technically, environmentally and economically practicable** and appropriate to ensure the relevant quality standards for compost and to attain the targets set out in Article 11(2)(a), (c) and (d) and 11(3).
 - They shall take measures, as appropriate, and in accordance with Articles 4 and 13, to **encourage** the following:
 - (a) the recycling, including composting, and digestion of bio-waste;...



TEEP in the WFD: the evolution

- EP amendments March 2017

Text proposed by the Commission

Member States shall ensure ~~the~~ separate collection of bio-waste ~~where technically, environmentally and economically practicable and appropriate to ensure the relevant quality standards for compost and to attain the targets set out in Article 11(2)(a), (c) and (d) and 11(3).~~

Amendment

1. Member States shall ensure separate collection **at source** of bio-waste, **in accordance with Article 10(2).**

(Justification: «*The introduction of technical, environmental and financial limits has allowed numerous exemptions, rendering application of this principle impossible*»)



TEEP in the WFD: the evolution

- EP amendments March 2017 – Art. 10 (2)

Original 2008/98/EC	Approved amendment March 2017
<p>Art. 10 (2). Where necessary to comply with paragraph 1 and to facilitate or improve recovery, waste shall be collected separately <u>if technically, environmentally and economically practicable</u> and shall not be mixed with other waste or other material with different properties.</p>	<p>Art. 10 (2). In order to comply with paragraph 1 and to facilitate or improve recovery, waste shall be collected separately and shall not be mixed with other waste or other material with different properties.</p> <p>By way of derogation from the first subparagraph, Member States may exclude sparsely populated areas where it is demonstrated that separate collection does not deliver the best overall environmental outcome taking into account life-cycle thinking.</p> <p>Member States shall notify the Commission of their intention to make use of this derogation. The Commission shall review the notification and assess whether the derogation is justified, (...)</p>

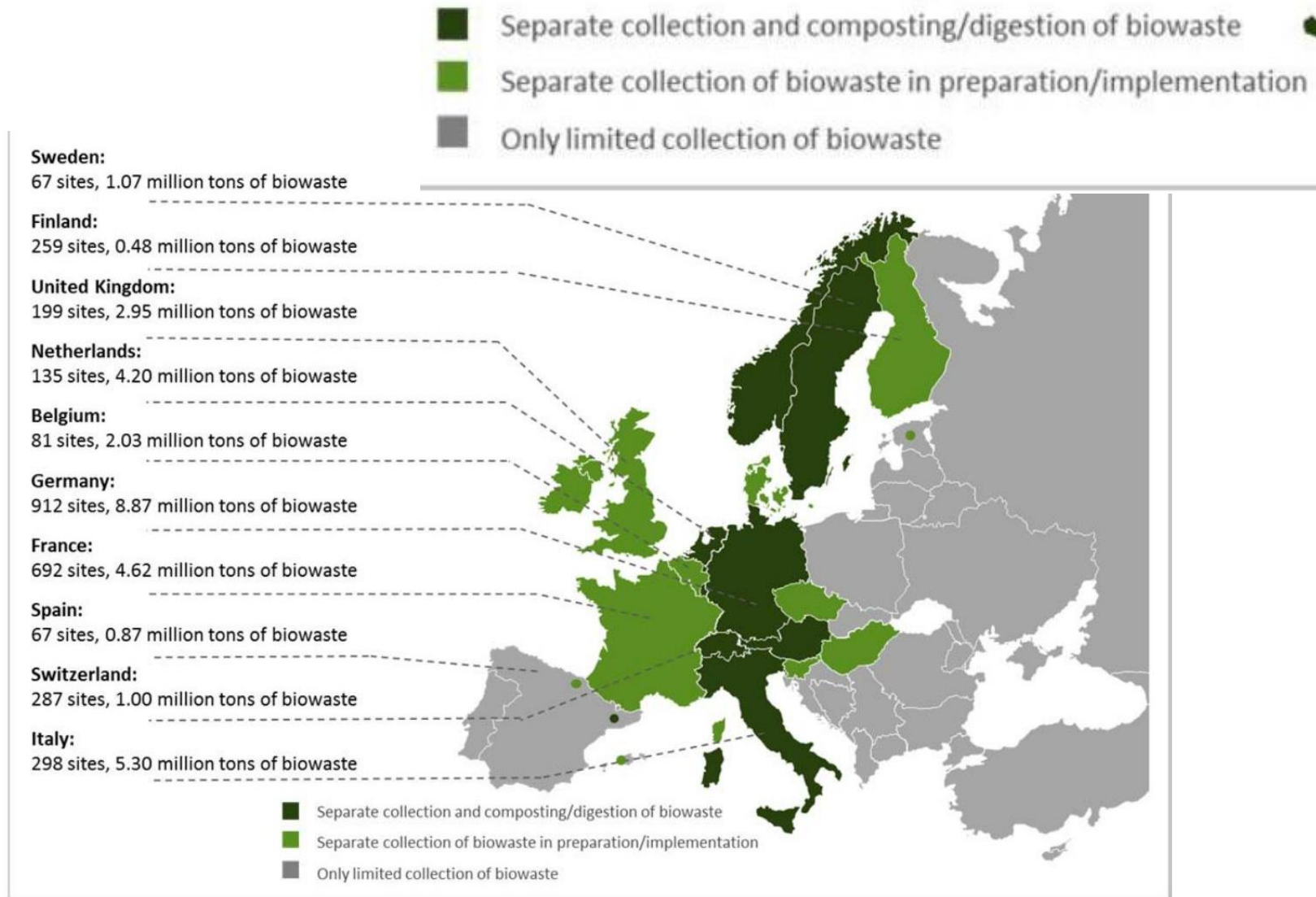


WHY BIOWASTE



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Separate Collection of Biowaste in Europe




Source: ECN, 2017

Leaders and laggards


Who is supporting the Circular Economy?


Leaders and laggards: we reveal where EU governments stand


 **Recycling**
Supports 65% or higher recycling target for Municipal Solid Waste

 **Corporate responsibility**
Supports binding minimum requirements for extended producer responsibility at EU level, including full cost coverage and modulated fees

 **Biowaste**
Supports a mandatory separate collection of biowaste and/or a biowaste recycling target

 **Reuse**
Supports specific targets for preparation for reuse of Municipal Solid Waste

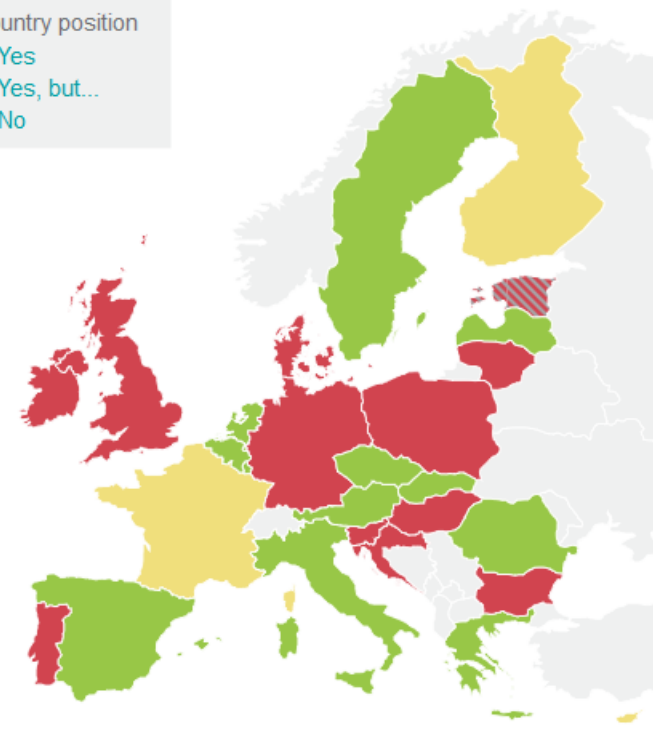
 **Waste prevention**
Supports waste prevention targets

 **Packaging**
Supports 10% or higher packaging reuse target

- ✓ AT
- ✓ BE
- ✗ BG
- ... CY
- ✓ CZ
- ✗ DE
- ✗ DK
- ? EE
- ✓ EL
- ✓ ES
- ... FI
- ... FR
- ✗ HR
- ✗ HU
- ✗ IE
- ✓ IT
- ✗ LT
- ✓ LU
- ✓ LV
- ? MT
- ✓ NL
- ✗ PL
- ✗ PT
- ✓ RO
- ✓ SE
- ✗ SI
- ✓ SK
- ✗ UK

Country position

- ✓ Yes
- ... Yes, but...
- ✗ No



Food and other biodegradable waste account for 30-50% of all Municipal Solid Waste. When separated and composted, biowaste can be used to enrich our soils, improve the recycling of other waste streams, reduce residual waste and produce green energy such as biomethane.

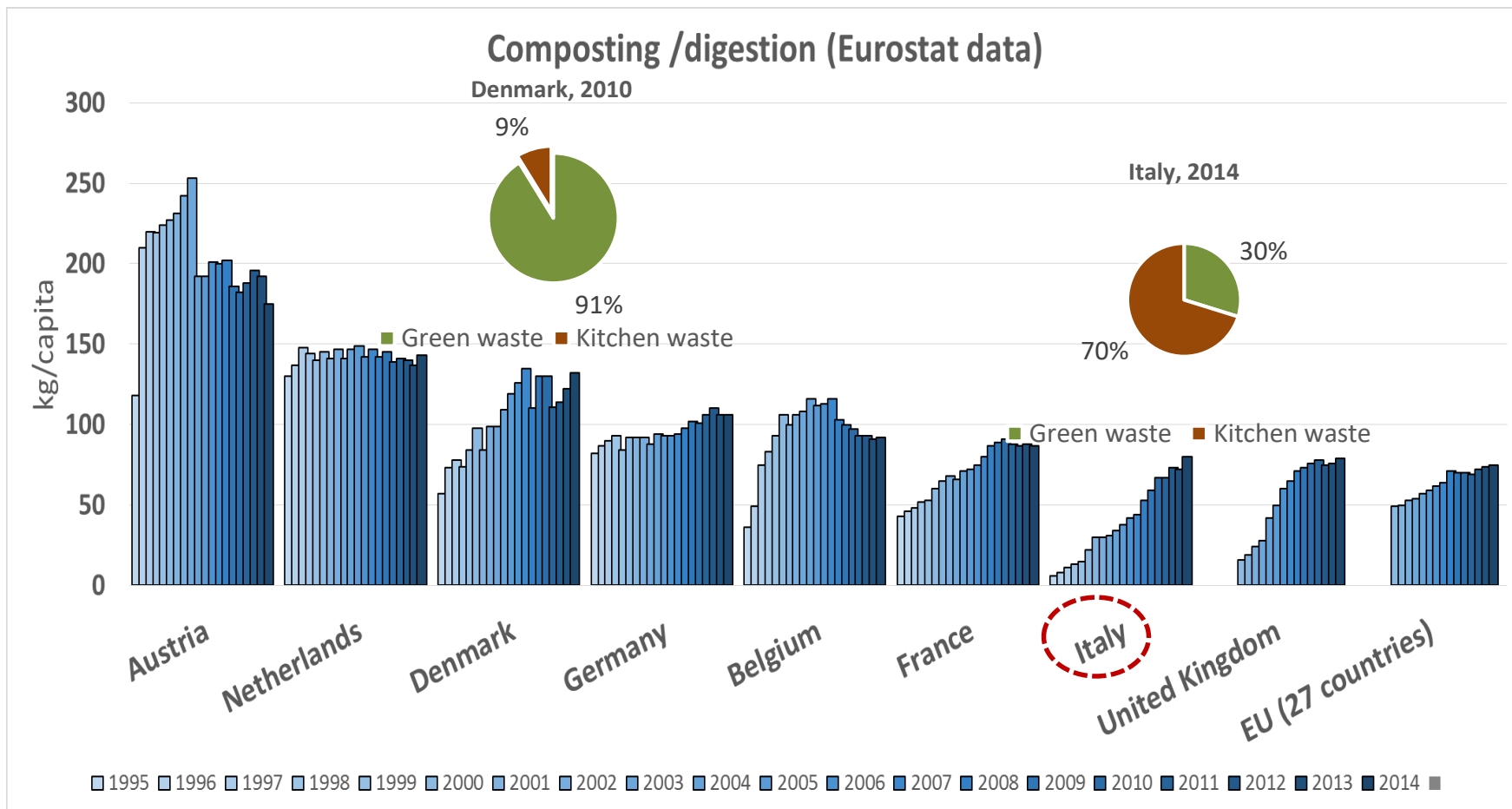
Data updated 11.05.2017



• Source EEB, updated May 17

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Eurostat: biowaste treatment (composting / AD)



Just food waste separately collected



Highest share in MSW

- Food waste (excluding garden waste) represents about 45% of municipal waste of domestic generators



Source: Agència de Residus de Catalunya, [link](#)



Biowaste

- Represents the highest share in MSW recyclables -> **has to be collected** to achieve high recycling targets!
- Does not benefit from EPR schemes -> **has to be supported**
- Generates the highest environmental impact when landfilled -> **has to be diverted**



TECHNICALLY PRACTICABLE?



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Biowaste collection: key elements



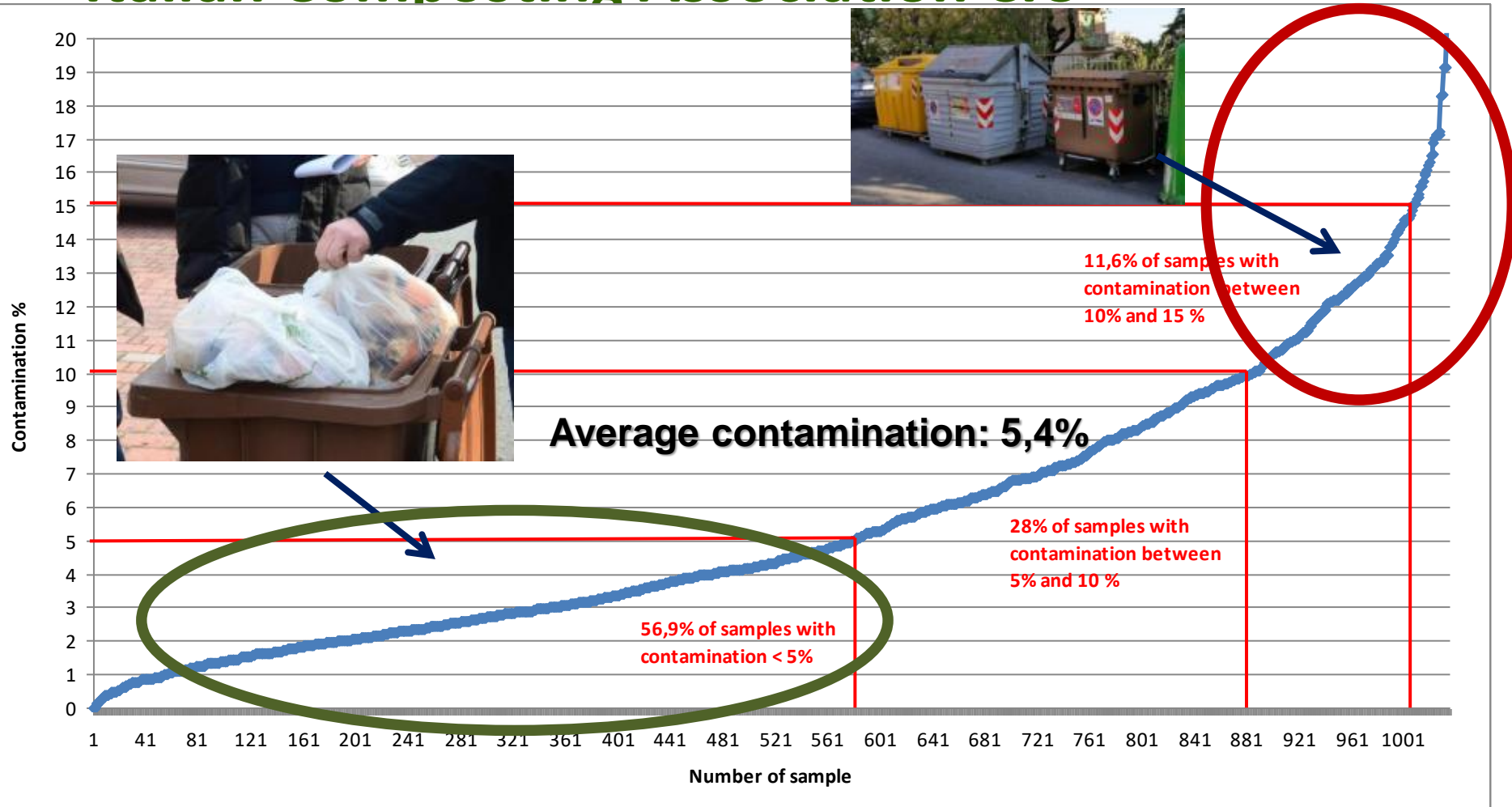
Food waste: the easiest path from the kitchen to the bin

Pictures: M. Giavini and Novamont



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Quality: characterizations performed by the Italian Composting Association CIC



• 1823 analyses



Dense areas / large cities

- Munich
- Milan
- Ljubljiana
- More coming (Madrid, Paris)
- (CH: Geneve)



PARIS

SERVICES ET INFOS PRATIQUES ACTUALITÉS

Collecte des déchets alimentaires: c'est parti!
Mis à jour le 4 mai 2017 - Déchets - Environnement

Accueil → Actualités → Collecte des déchets alimentaires: c'est parti!



■ SUISSE ROMANDE

A Genève, trier ses déchets devient un objectif cantonal

71
NOTICES

Le canton de Genève vient de mettre en place des poubelles vertes réservées aux déchets organiques. C'est une première. Objectif : réduire d'un tiers les déchets incinérés.



New York, 2017



STUYTOWN
STUYVESANT TOWN | PETER COODER VILLAGE

Composting Guidelines

Join your neighbors to keep food scraps, food-soiled paper, and yard waste out of landfills and deter pests in your building.

Why Collect Organics

Food scraps, food-soiled paper, and yard waste make up one-third of New York City's total waste. Collecting this material separately can help the City reduce trash disposal costs and achieve its recycling goals. It can also help deter pests and rodents by securing food scraps in custom bins with latching lids.

What Happens to the Organics Collected

The Department of Sanitation will turn organic material into renewable energy or compost to be used as organic fertilizer in the City's parks, gardens, and streetscapes.

How To Participate

1. Collect your organic waste separately from your trash and other recyclables in any container or bag.
2. Store the container or bag in a convenient location in your kitchen.
Tip: Keeping organic waste in your freezer will help prevent odors and pests.
3. Recycle organic waste! Empty the container or bag into your building's organic bin.

Instructions From Your Building

Please do not put plastic bags, pet waste, or personal hygiene products in the bin.
To latch shut: 1) Flip handle up. 2) With force, push lid down. 3) Flip handle down until latch clicks into place.

What Goes in the Brown Bin

Food Scraps fruit, vegetables, meat, bones, dairy, prepared foods	Food-Soiled Paper napkins, towels, tea bags, pizza, coffee filters
Yard Waste plants, leaves, garden trimmings, grass, branches	Trash plastic bags or wrappers, pet waste, medical waste, diapers, hygiene products

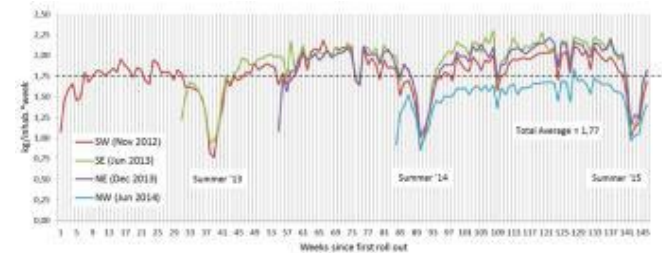
• Metal, Glass, Plastic, Cardboard, or Clean Paper & Cardboard
Plastic these items separately from organic waste.

nyc.gov/organic
NYCcomposts



Food waste collection programme in Milan: summary results

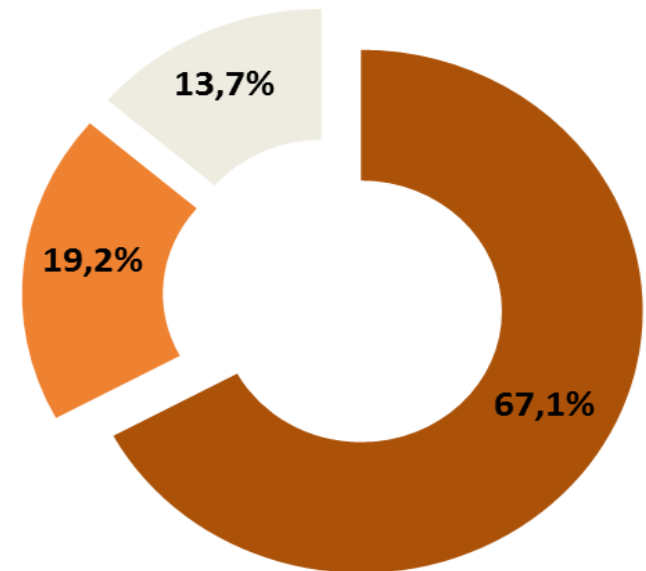
- Commercial and households food waste collection → **103 kg/capita/yr**



- **Purity of foodwaste** from sep. collection:
 - average non-compostable content **4.5%**

- **Diversion of foodwaste from residual waste**
- About 130,000 t/year of food waste are now collected separately and sent to AD for orga recycling saving 8,760 t of CO₂ /year**

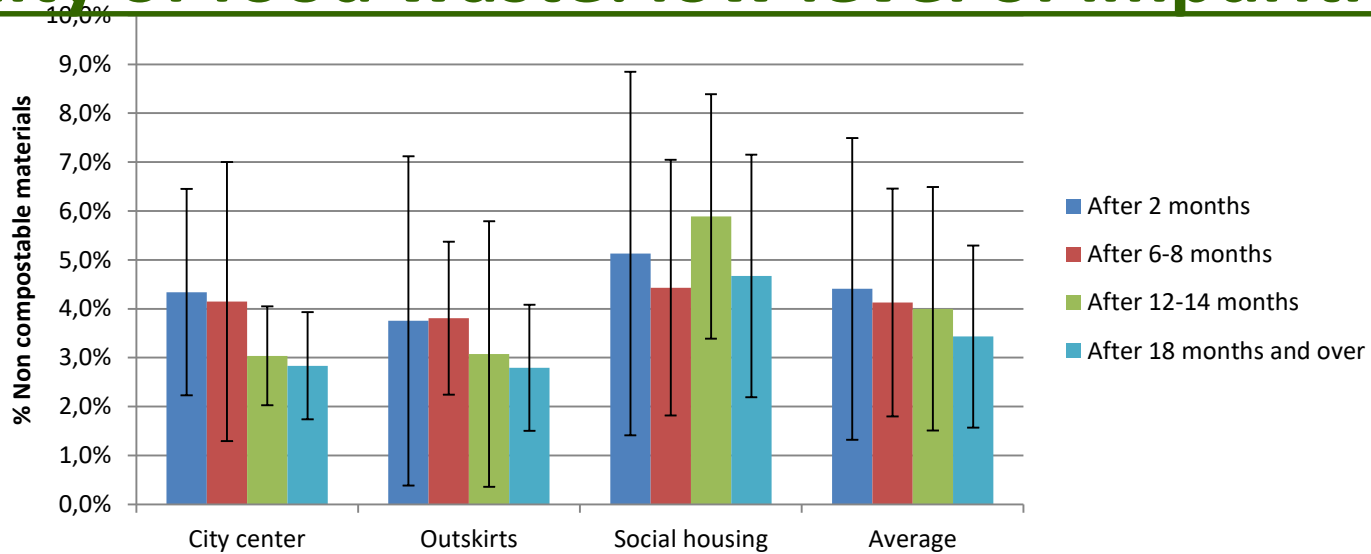
- Calculated by CIC, the Italian Composting and Biogas Consortium based on the Defra (UK) tool, 2011



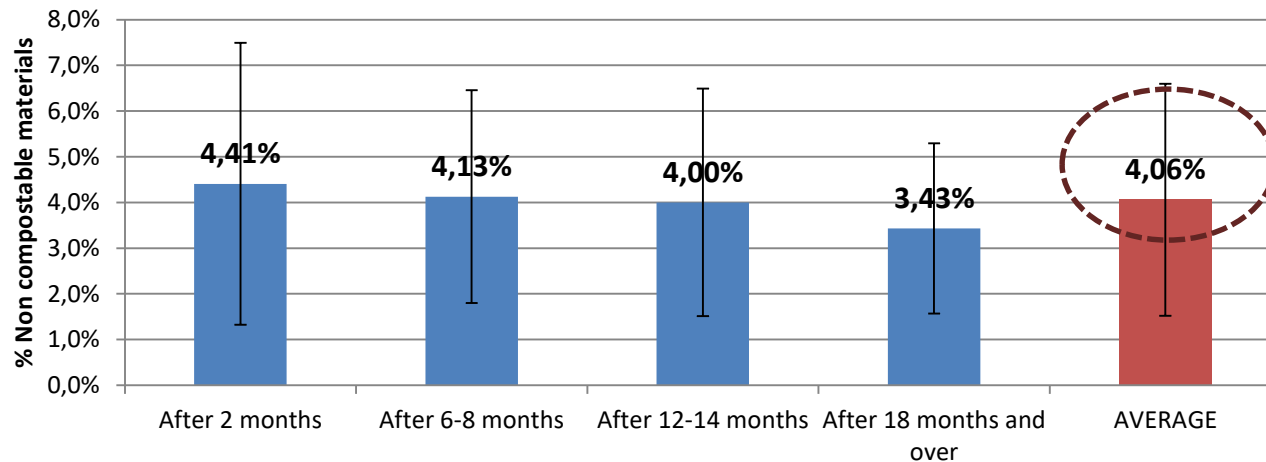
- Residential food waste
- Commercial food waste
- Food waste left in residual waste



Quality of food waste: low level of impurities



Non compostable materials - average trend



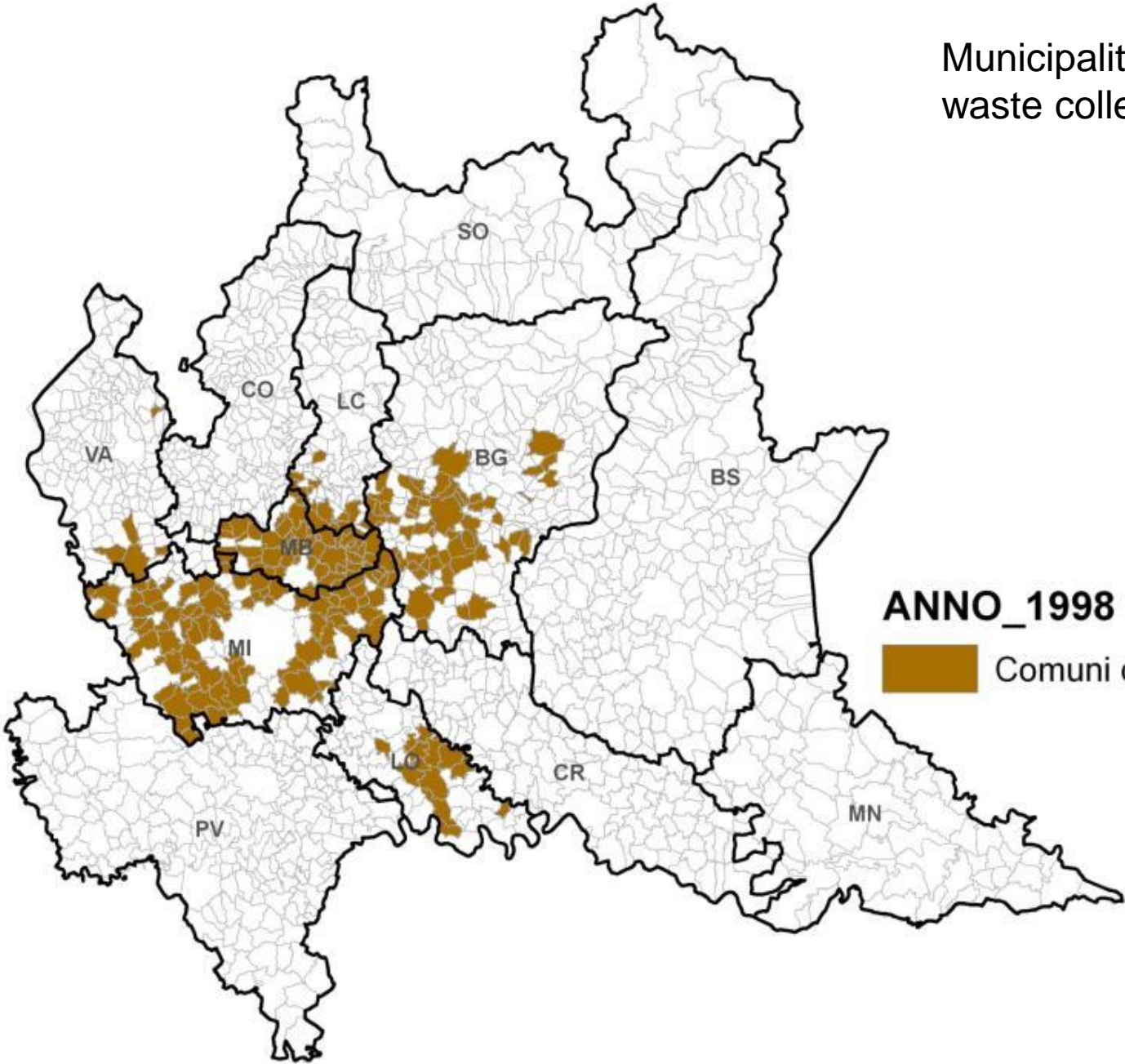
Source: analyses performed by CIC for AMSA / Novamont




DOMINO EFFECT: FOOD WASTE COLLECTION IN LOMBARDY



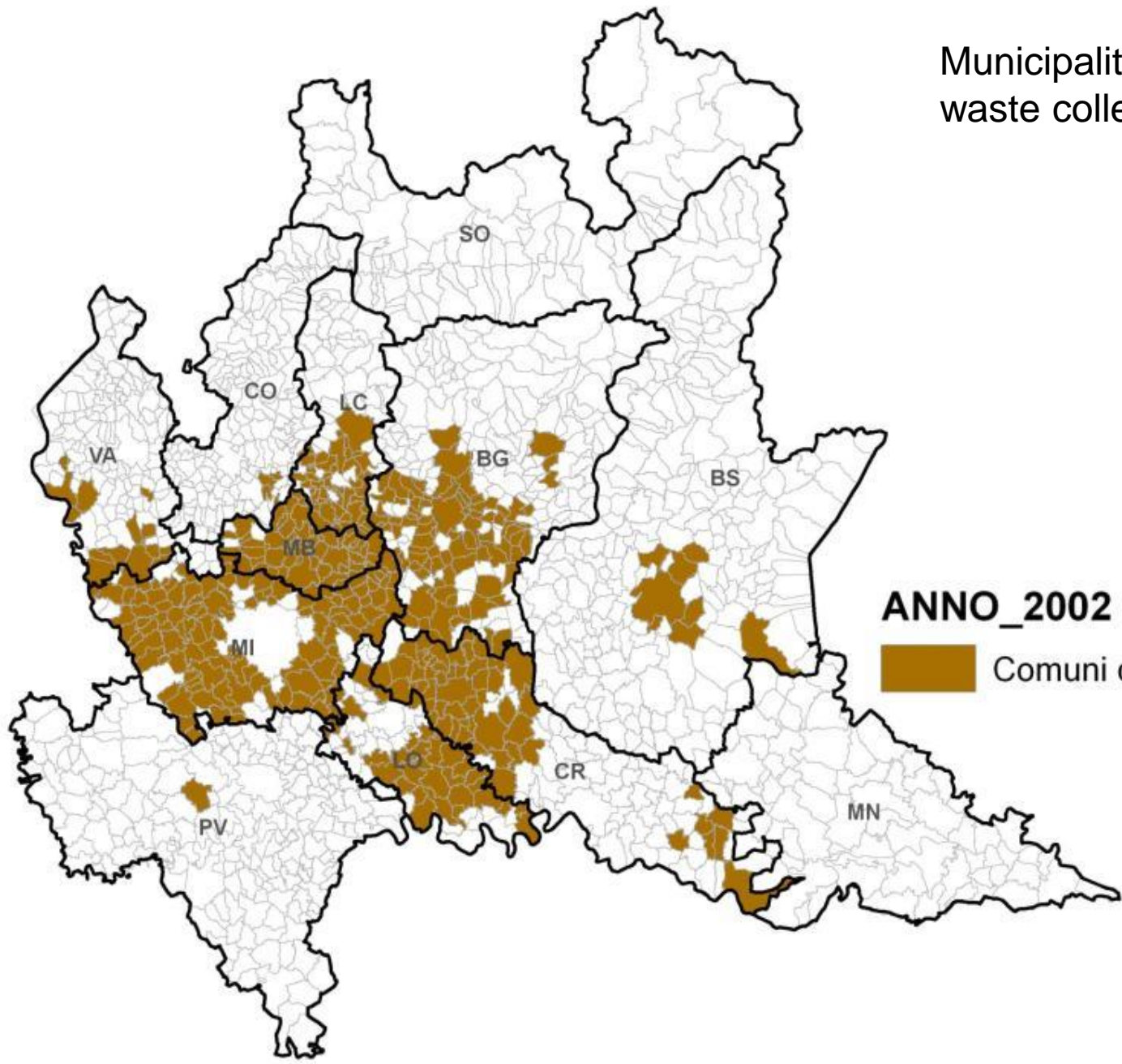
Municipalities with food waste collection




ANNO_1998

 Comuni con raccolta FORSU

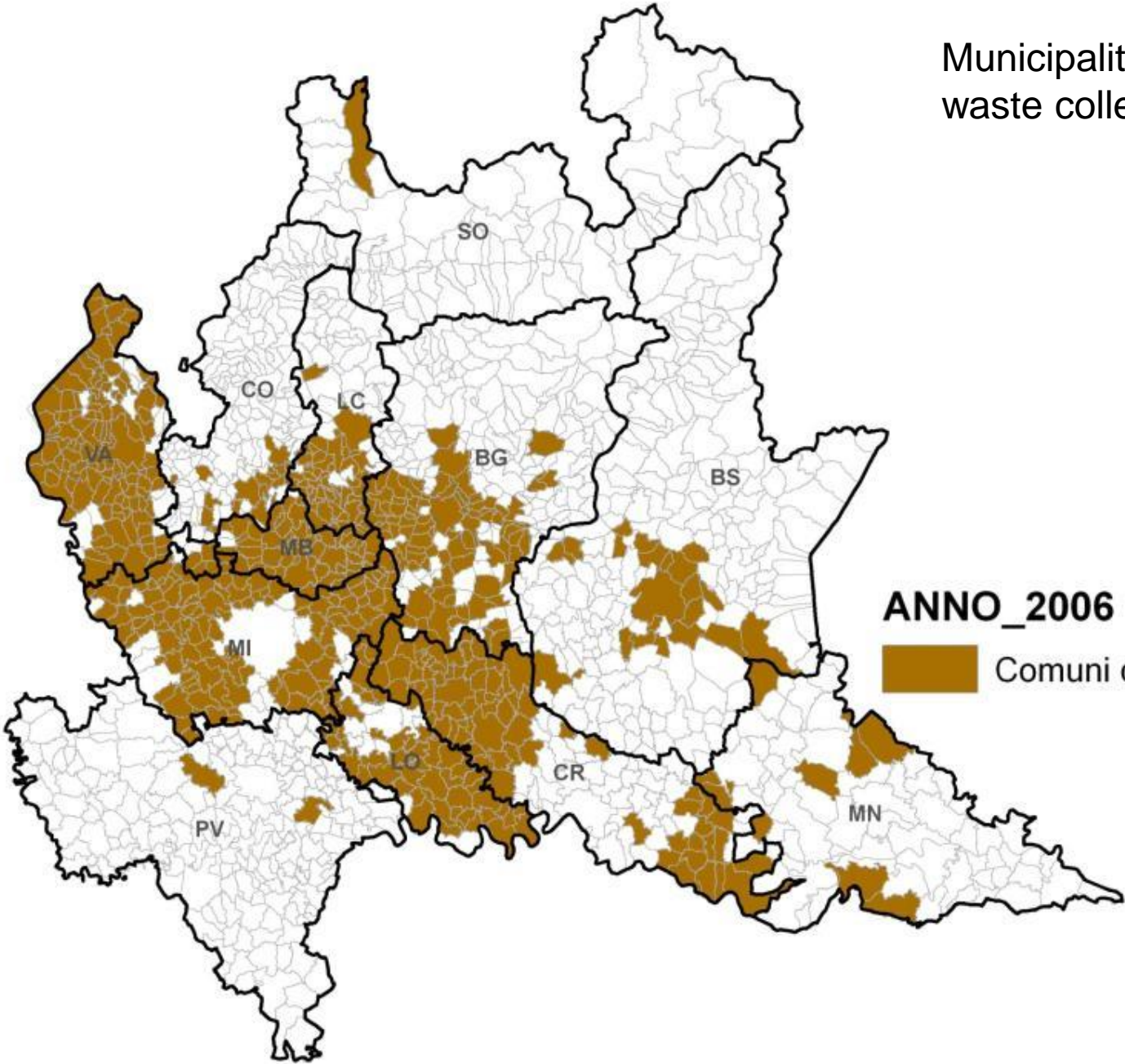
Municipalities with food waste collection




ANNO_2002

 Comuni con raccolta FORSU

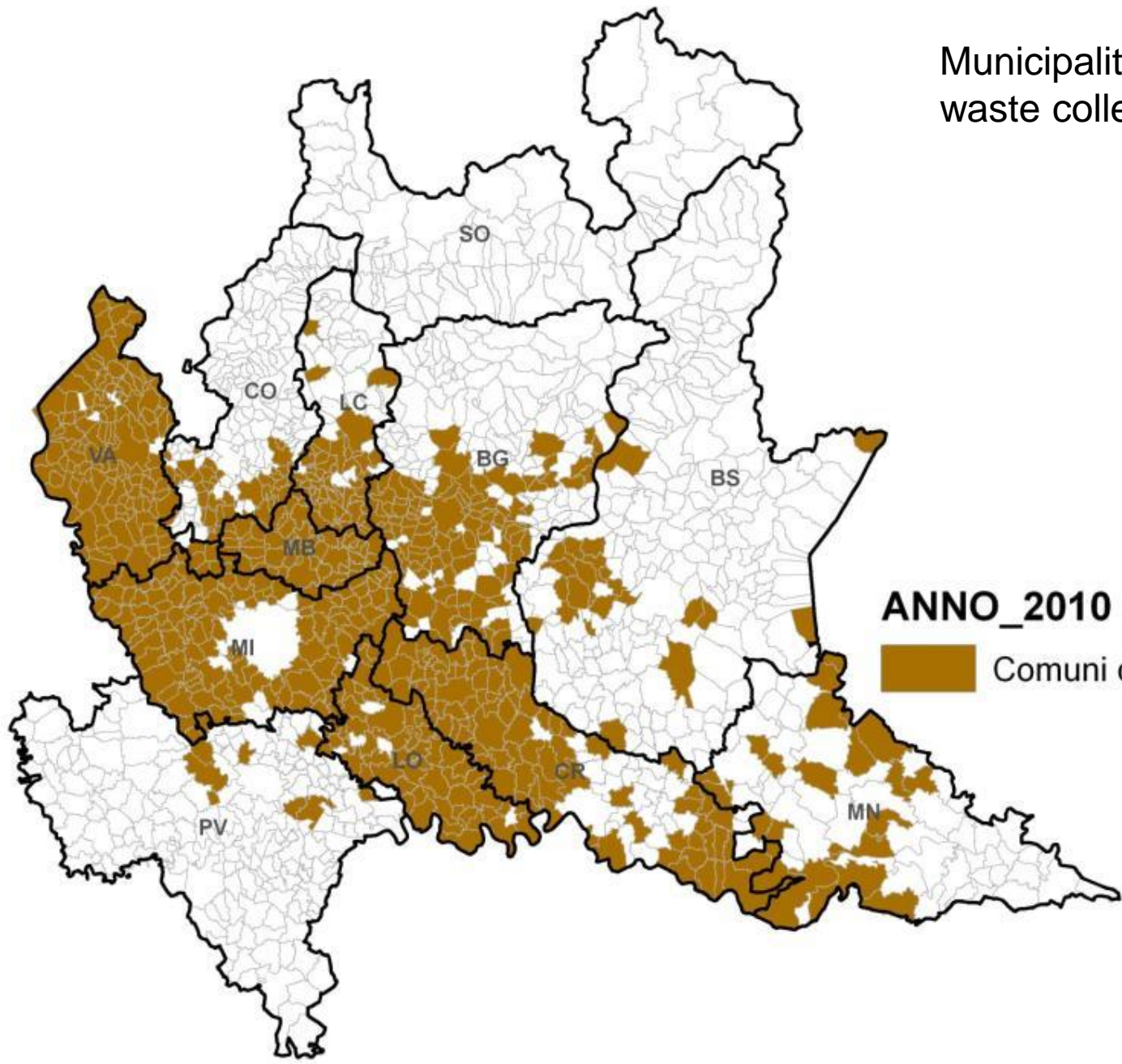
Municipalities with food waste collection




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 Comuni con raccolta FORSU

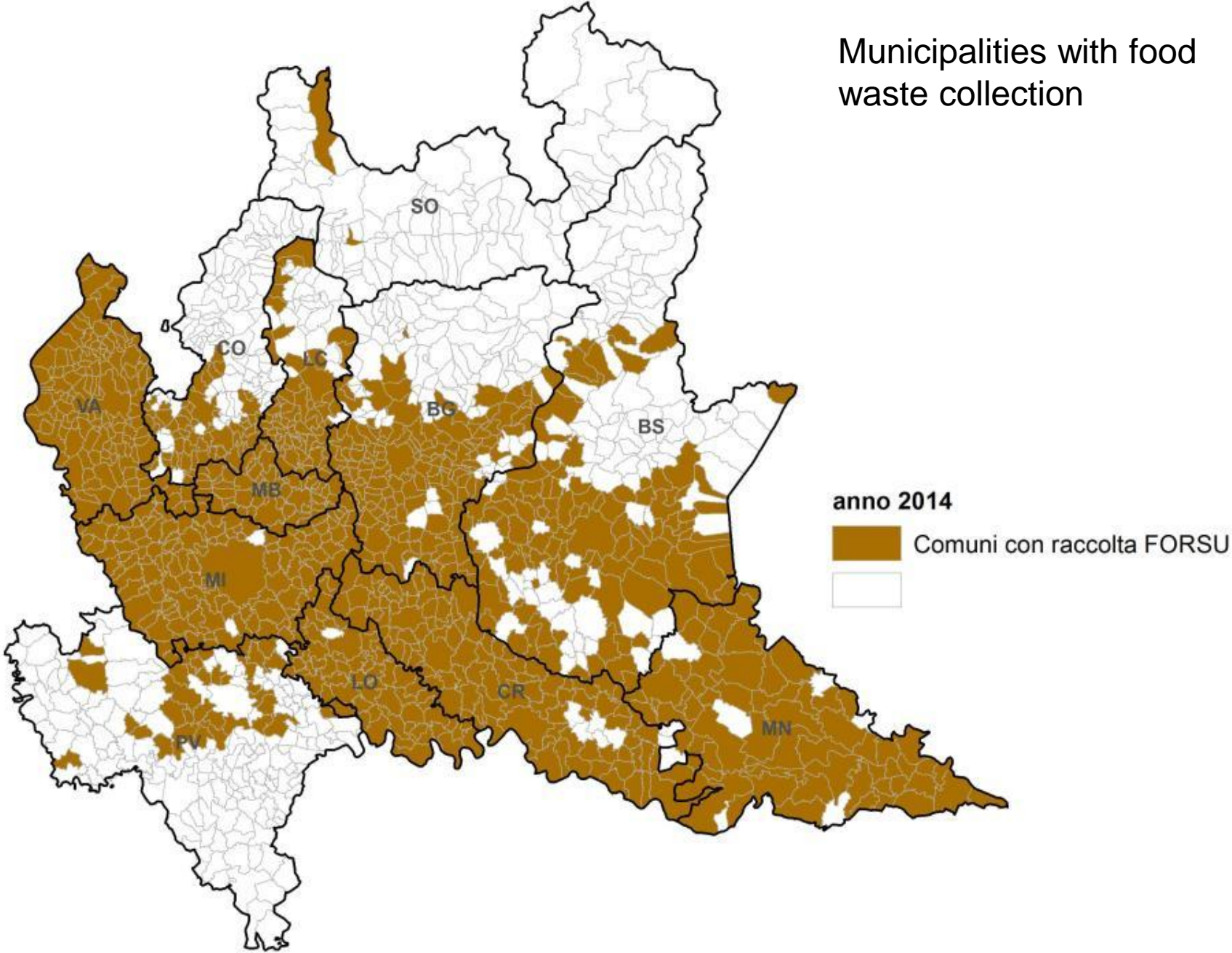
Municipalities with food waste collection



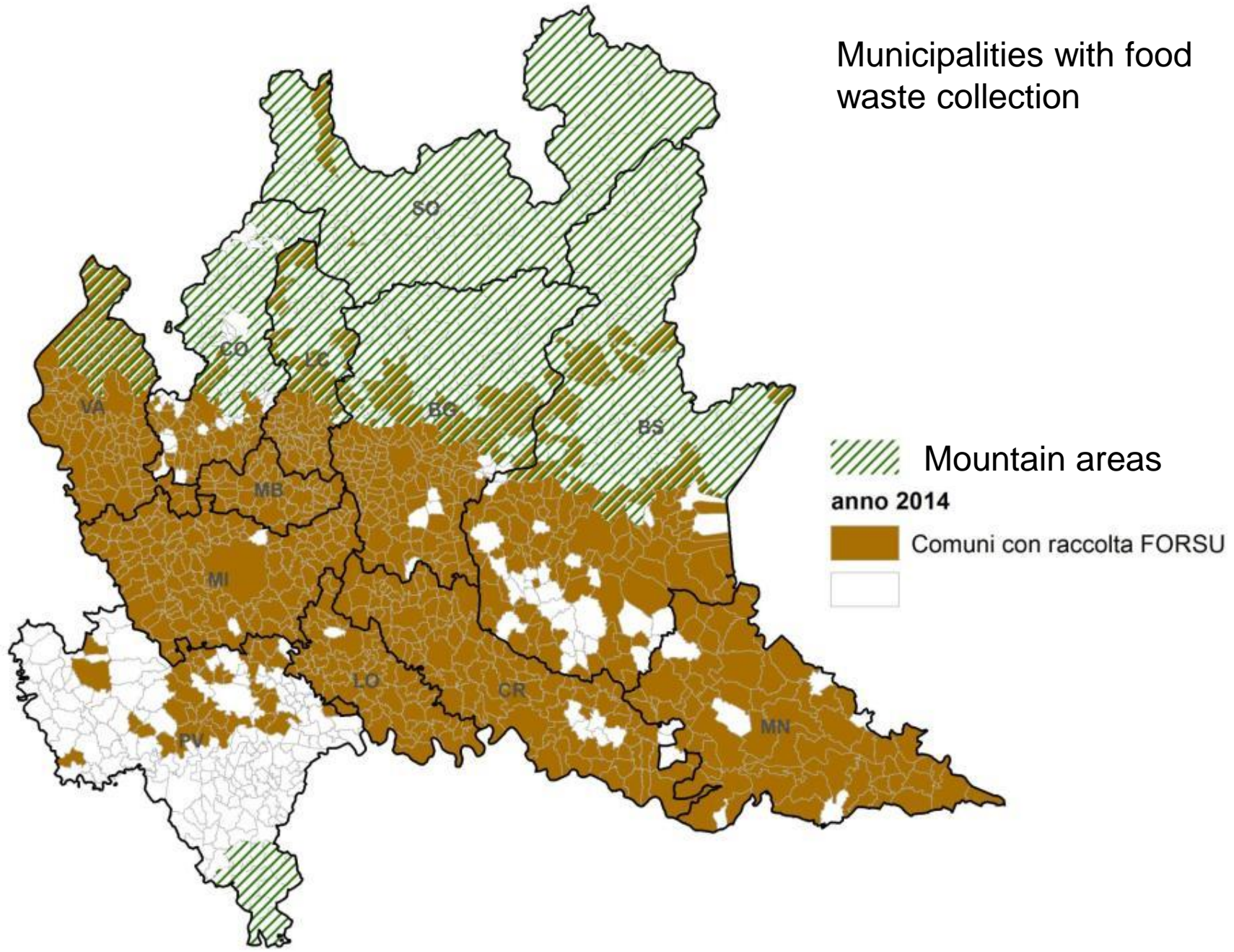
ANNO_2010

 Comuni con raccolta FORSU

Municipalities with food waste collection

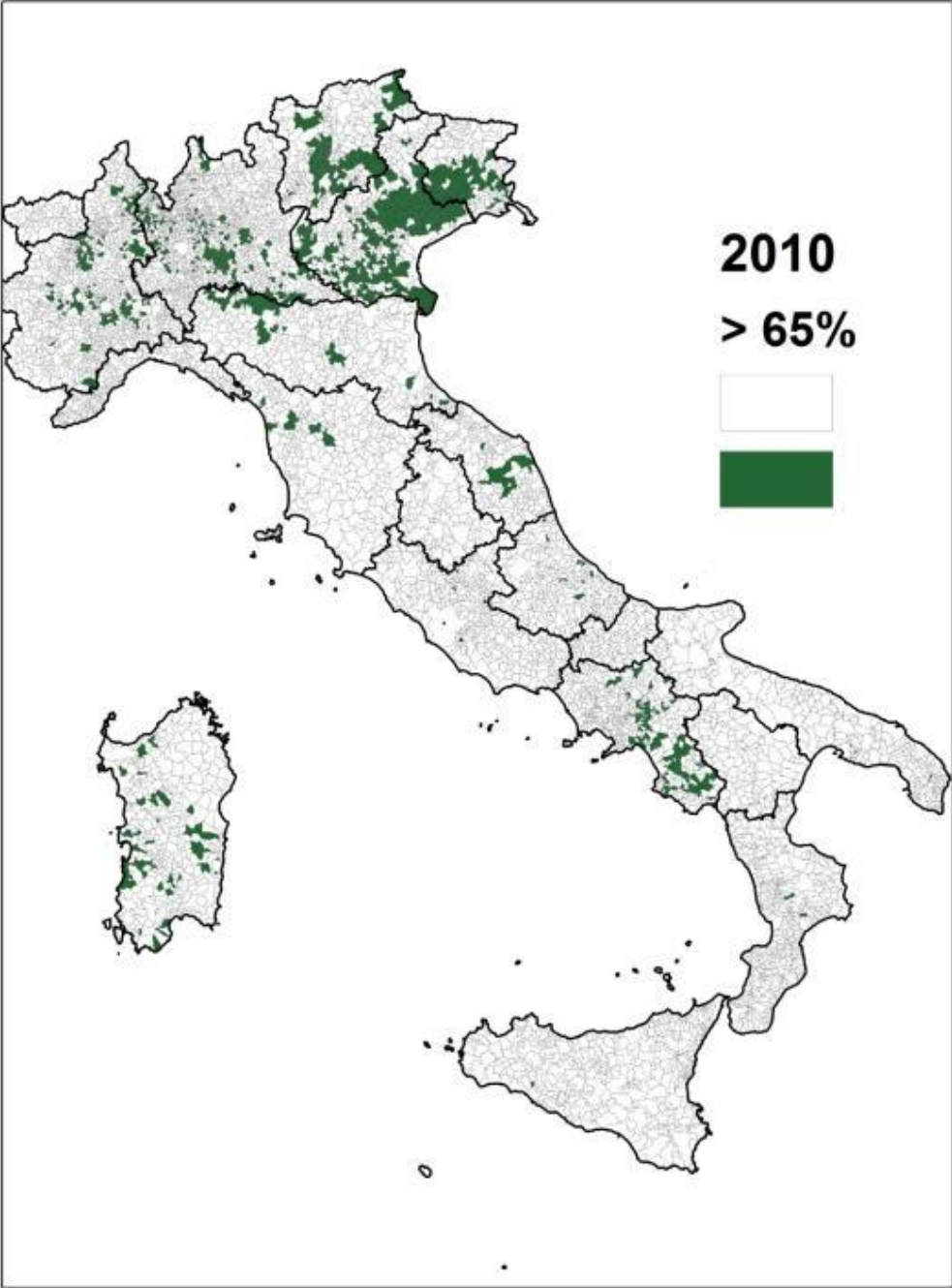


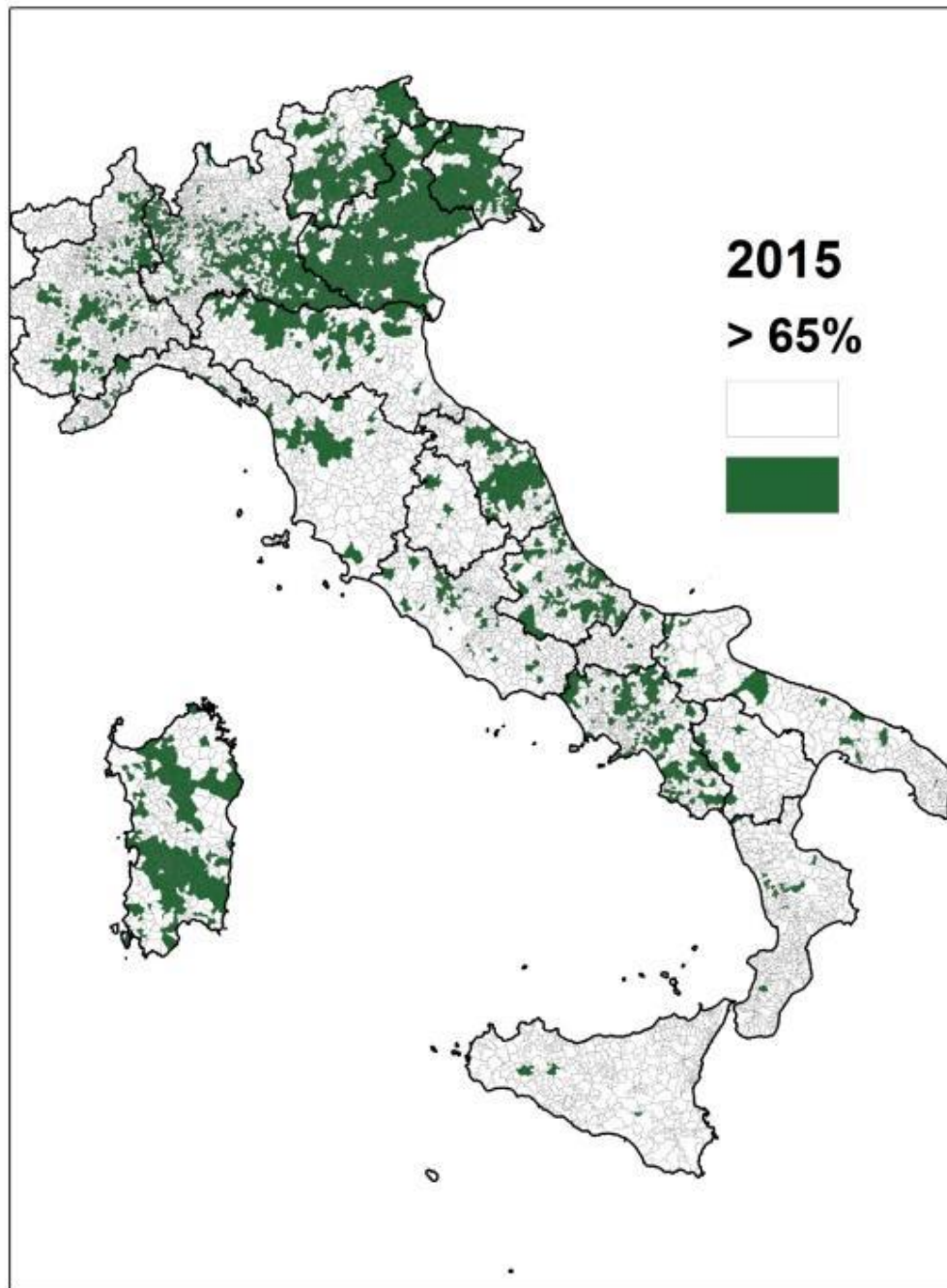
Municipalities with food waste collection



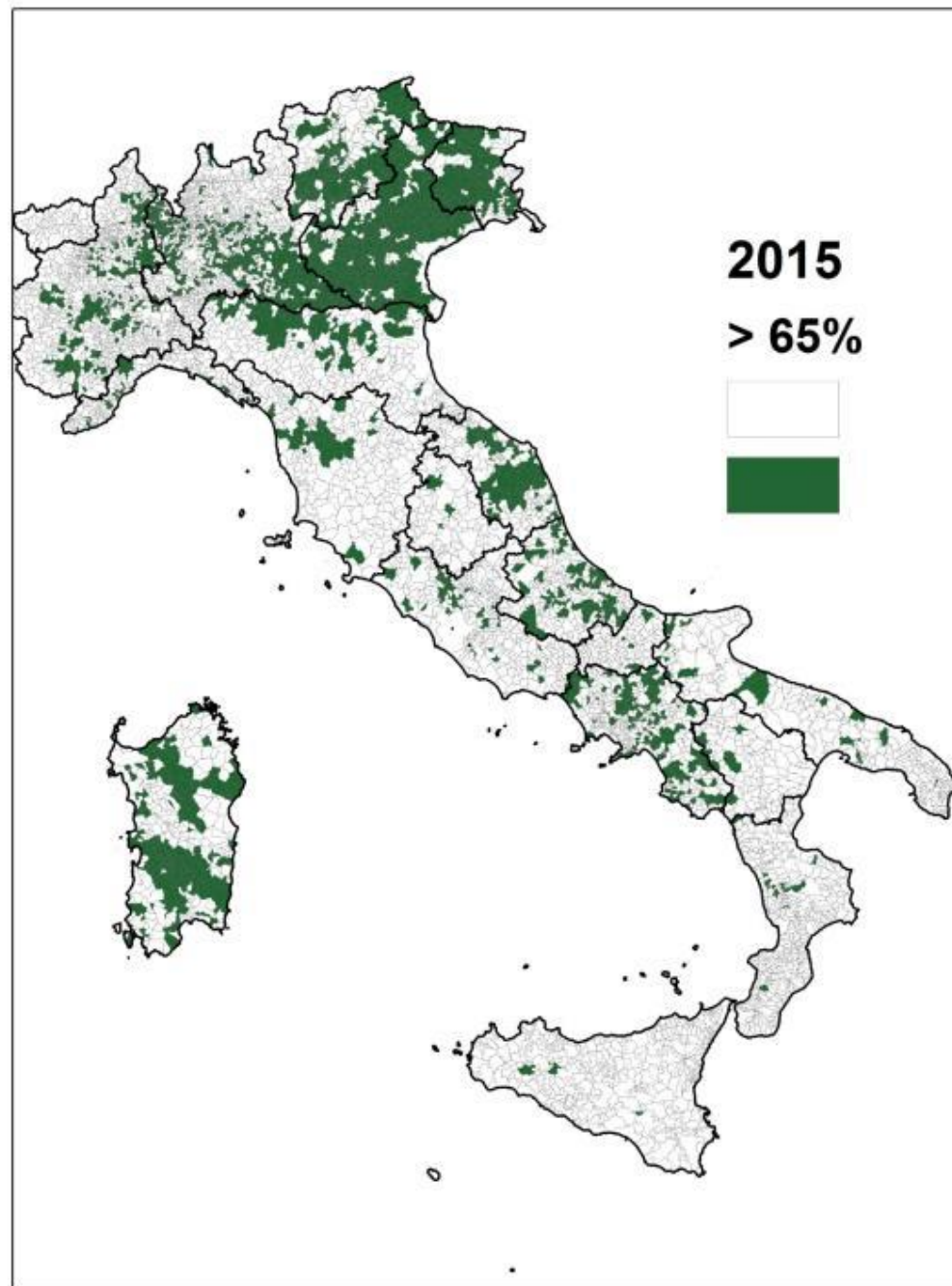
Frontrunners and replication effect







- At least one best practice in each Region!
- -> High recycling (with biowaste collection) is possible **everywhere**
- Rely on and support the **frontrunners**



Optimization tools for rural areas

- Light trucks with splitted tank for the collection of food waste and residual waste at the same time



Optimize transportation with low cost transfer stations



Contarina (IT)



Other options for rural areas: community composting / micro scale plants

- Effective way to engage people
- Be careful to ensure high participation (> 60%)
- Higher sense of civic duty needed (low impurity level)
- Avoid **expensive** machinery with **low participation**



ENVIRONMENTALLY PRACTICABLE?



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Many studies published



JRC TECHNICAL REPORTS

Improving Sustainability and
Circularity of European Food Waste
Management with a Life Cycle
Approach

Simone Manfredi
Jorge Cristobal
Cristina Torres de Matos
Michele Giavini
Alessandro Vasta
Serenella Sala
Erwan Saouter
Hanna Tuomisto

2015



Simone Manfredi
Jorge Cristobal
Cristina Torres de Matos
Michele Giavini
Alessandro Vasta
Serenella Sala
Erwan Saouter
Hanna Tuomisto

2015

Link:

<http://publications.jrc.ec.europa.eu/repository/bitstream/JRC99238/lbna27657enn.pdf>



Imagine the result



FINAL REPORT
ASSESSMENT OF THE OPTIONS TO IMPROVE THE MANAGEMENT OF
BIO-WASTE IN THE EUROPEAN UNION
STUDY CONTRACT NR 07.0307/2008/517621/ETU/G4
EUROPEAN COMMISSION DG ENVIRONMENT
ARCADIS Project number – 11/004759 | Version C | 12-02-2010



Link:

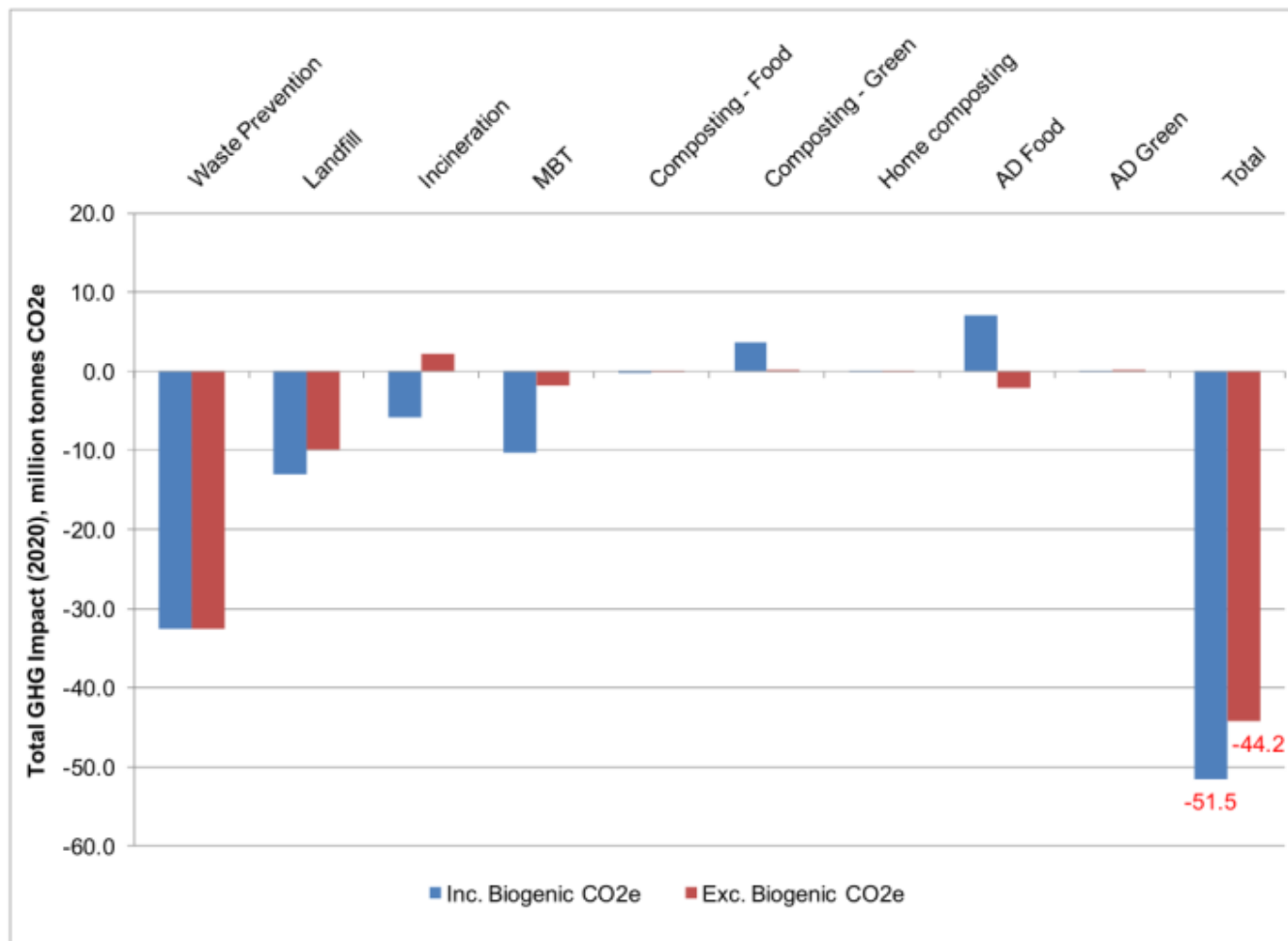
http://ec.europa.eu/environment/waste/compost/pdf/ia_biowaste%20-%20final%20report.pdf

EC assessment Arcadis-Eunomia, 2009

Table 9-4: Key Assumptions Underpinning Scenario 2a

Key Assumptions	
Scenario 2a	<ul style="list-style-type: none"> 7.5% waste prevention of biowaste arisings 60% food waste capture by 2020 90% garden waste capture by 2020 Food waste treated by option with best greenhouse gas emissions outcome for each country

Figure 9-14: Total Greenhouse Gas Implications of Scenario 2a for the Year 2020 (Including & Excluding Biogenic CO₂ eq Impacts)

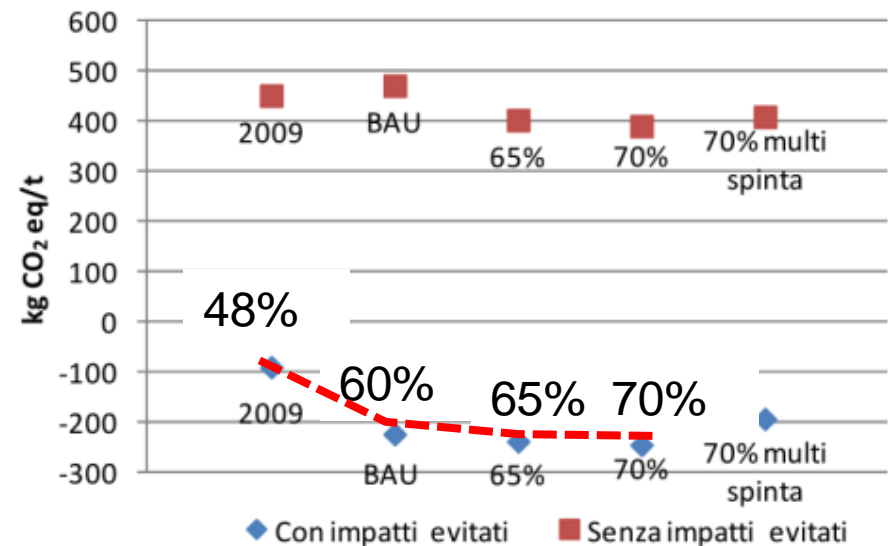


New Lombardy Waste Management Plan

- High recycling, with more than 65% separate collection (including biowaste) leads to higher environmental benefit



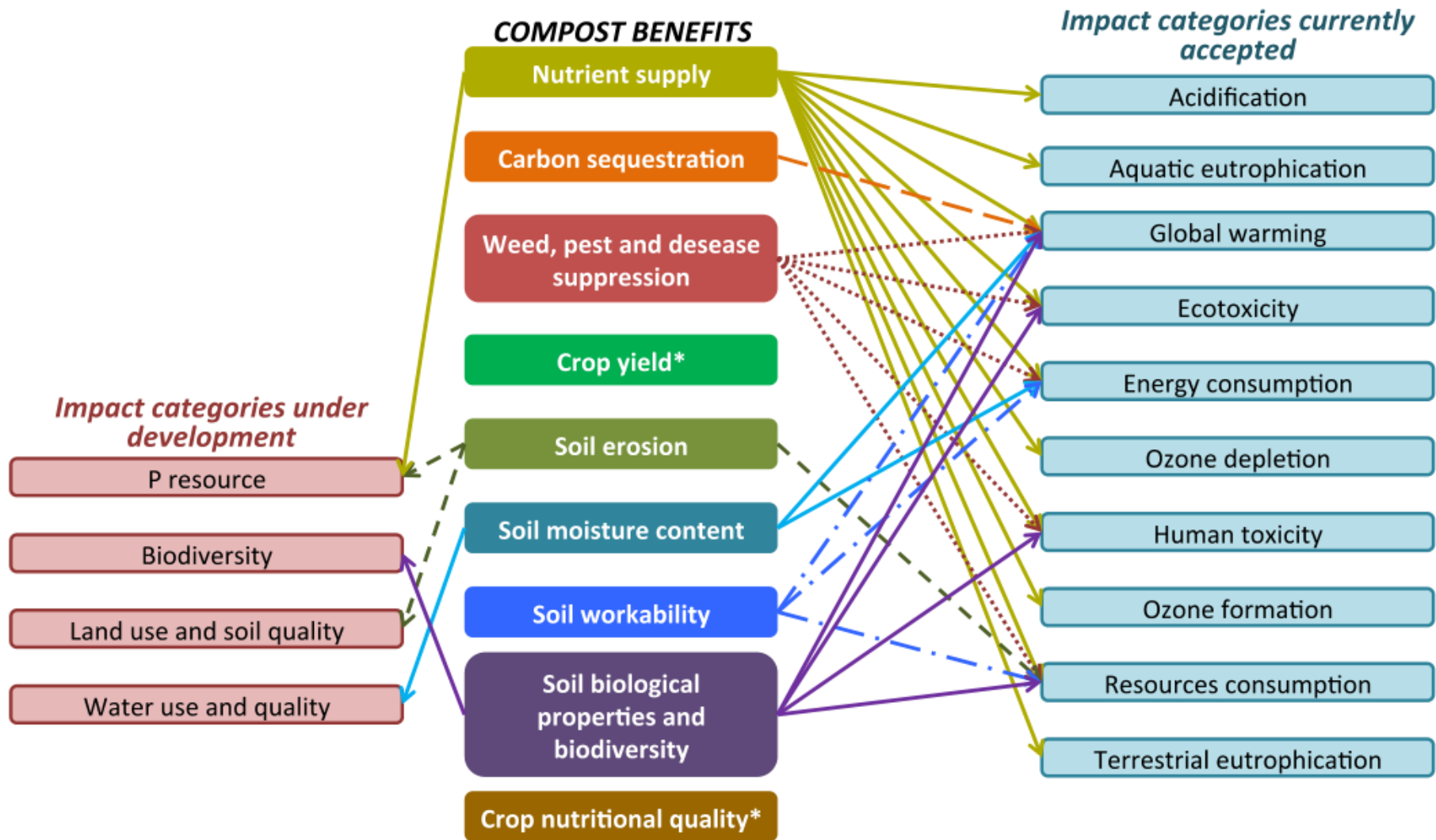
Global warming potential



Environmental benefits

- Anaerobic digestion probably qualifies as the most preferable option
- Compost used as a substitute of mineral fertilizers and peats brings benefits. However, without AD, composting can be in some cases energy intensive
- **Do not neglect additional benefits** (soil porosity, water retention etc.): need for research / better estimations



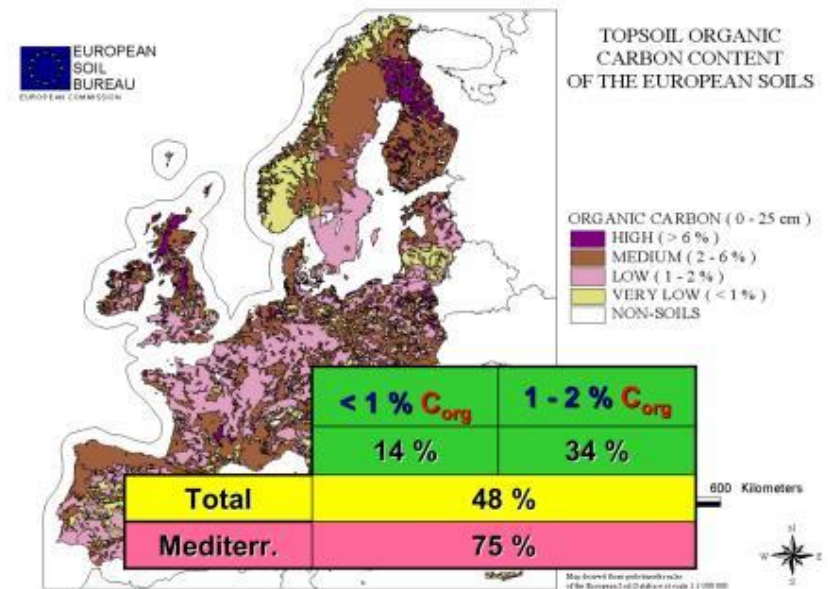


From: C. Lazcano et al. Environmental benefits of compost use on land through LCA – a review of the current gaps, 2014, [link](#)



Carbon sink

- a quick calculation (Favoino, 2008): overall yearly CO₂ emissions from a whole nation as Italy (541.542 Gg CO₂ 7 year) can be equaled by a lock-up of just 0,14% organic carbon in soils.

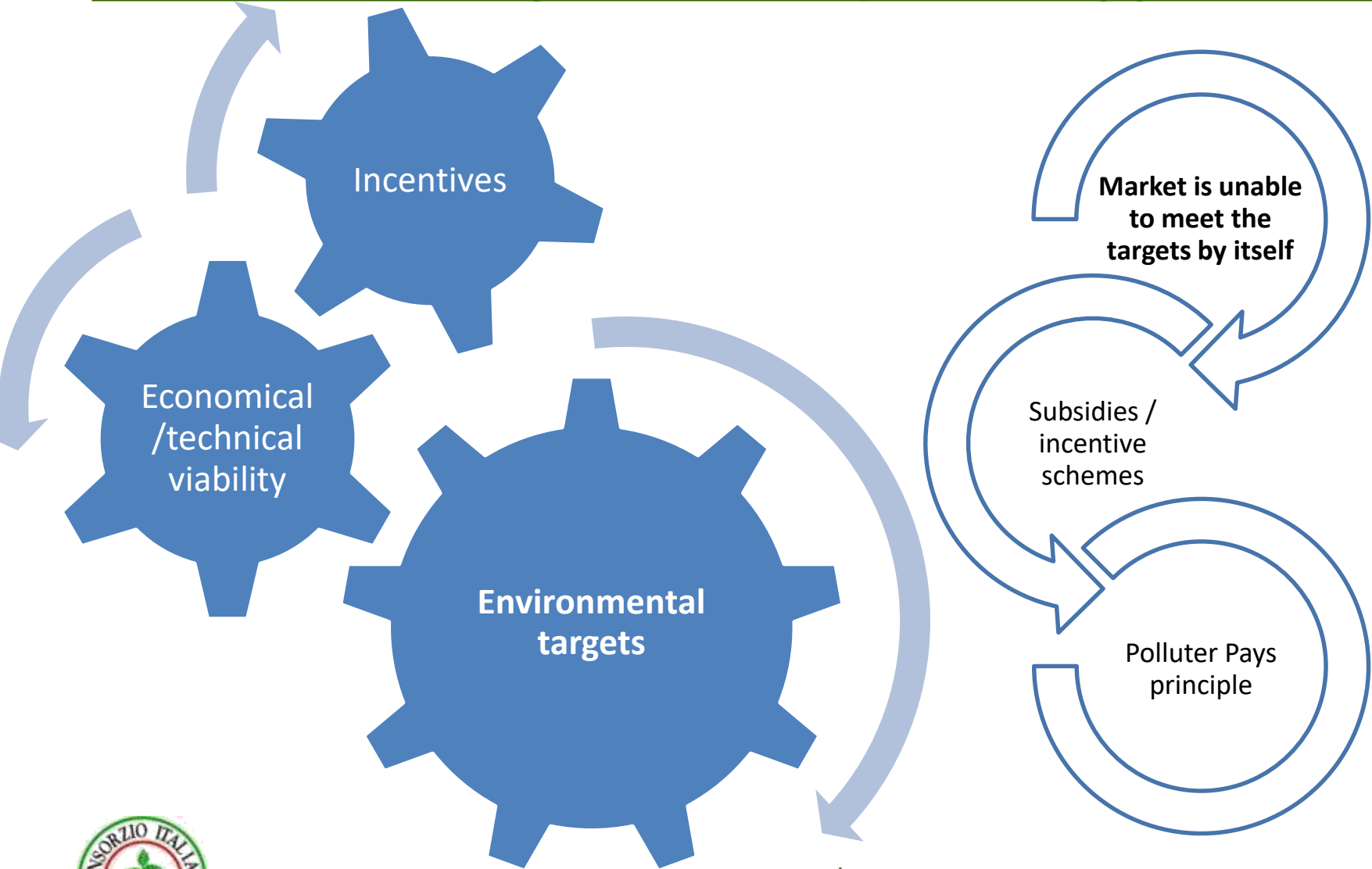


ECONOMICALLY PRACTICABLE?



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Practicable / unpracticable (if not supported ...)



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Example: EPR on packaging



- Packaging: Average fees charged to producers range from 14 €/t to 200 €/t, average of 92 €/t
- Results: Best performing ≠ most expensive schemes

Figure 6: Cost effectiveness of EPR schemes for packaging (2010 or 2011)

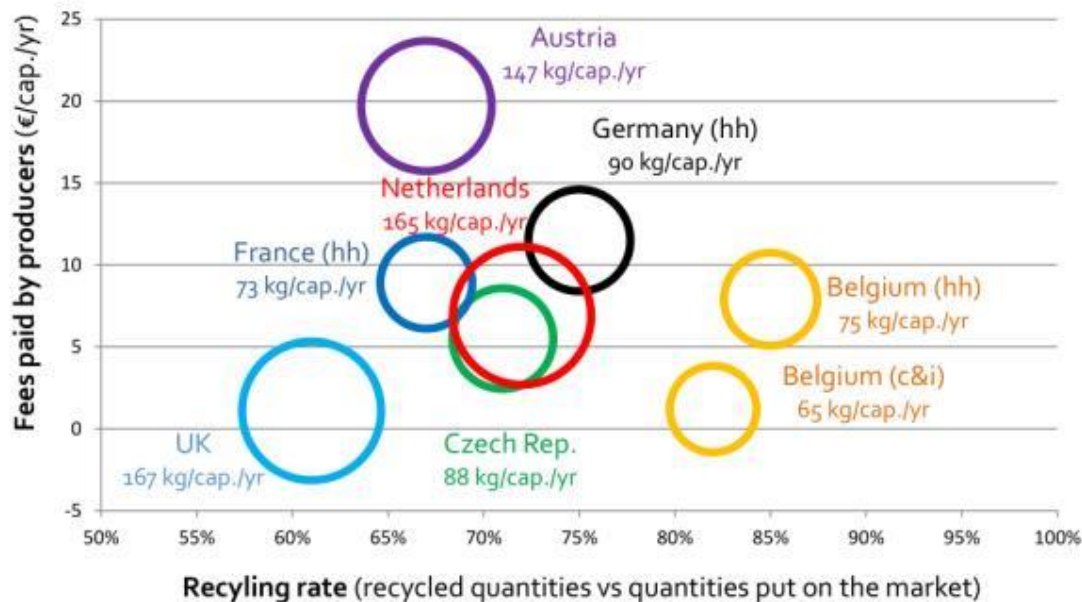
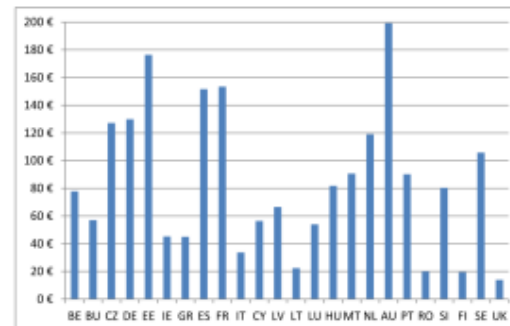


Figure 11: Average fee charged to producers per tonne of household packaging put on the market²⁰



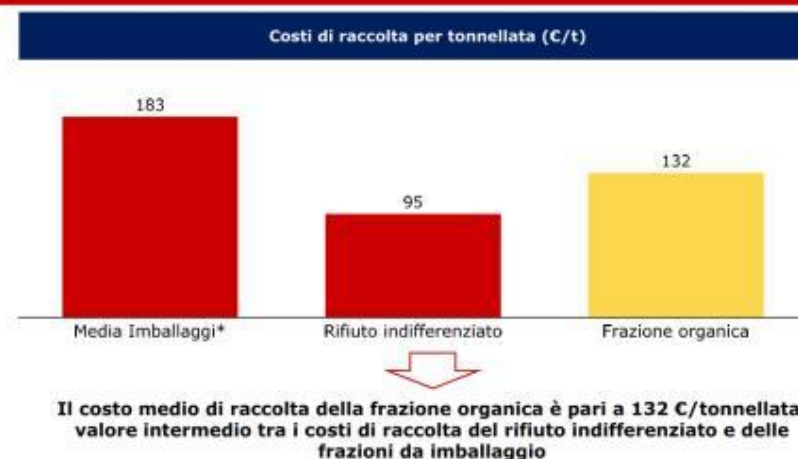
Source: [Guidance on EPR, BIO/EC, 2014](#)



Biowaste and economics

- Collecting biowaste is cheaper than collecting packaging, but:
 - Not subsidized with EPR
 - Alternatives?
 - Landfill tax (combined with a return scheme, see Catalonia)
 - Subsidies on biogas from food waste AD
 - Incentives on compost use
 - Carbon credits?

Analisi dei risultati Costo della raccolta differenziata della frazione organica



* Fonte: studio Federambiente-Itain & Compagny "Analisi dei costi della raccolta differenziata in Italia - seconda edizione" (2013)

This information is confidential and was prepared for Bior & Compost solely for the use of our client. It is not to be relied on by any 3rd party without their prior written consent.

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Source: Utilitalia,
2016



«Zero cost» incentive schemes

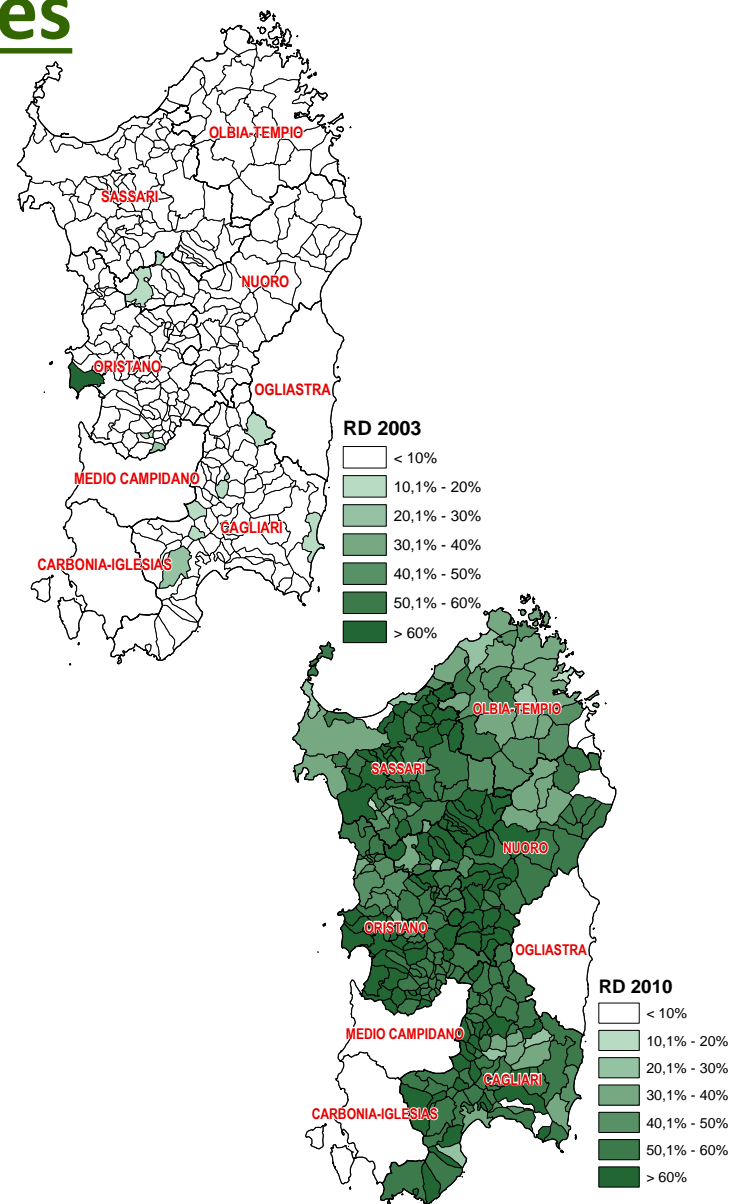
- Sardinia, 2003-2012
- Catalonia, 2004-ongoing

PREVISIÓ DE RETORN DEL CÀNON PEL 2013

INGRÉS *	Tn	Import unit. €/tn	Ingrés cànon €	% total
Residus Municipals Deposició	1.870.008	12,7	23.749.102	86,8%
Residus Municipals Incineració	621.751	5,8	3.606.153	13,2%
TOTAL	2.491.759		27.355.255	100,0%

RETORN	Tn	Import unit. €/Tn	Retorn cànon €	% total ingrés
1.1 Tractament de la FORM (gestió) NOVETAT	430.000	34,0	12.721.533	46,5%
1.2 Caracteritzacions i analítiques			635.000	2,3%
1.3. Optimització i millores de procés de plantes			1.000.000	3,7%
2.1. Reducció rebuig dipòsit controlat	690.000	4,0	2.760.000	10,1%
2.2 Reducció rebuig valorització energètica	220.000	1,5	330.000	1,2%
3. Impuls i comercialització del compost NOVETAT	70.000	4,5	315.000	1,2%
4. Tractament de la fracció vegetal	60.000	2,5	150.000	0,5%
Subtotal Tractament FORM			17.911.533	65,5%
5. Recollida selectiva FORM	430.000	9,0	5.471.956	20,0%
6. Recollida selectiva del paper i cartó	240.000	2,0	480.000	1,8%
7. Gestió residus especials a les deixalleries	3.000	700	2.100.000	7,7%
8. Autocompostatge NOVETAT			197.555	0,7%
9. Foment de la bossa compostable	20.000	5,0	100.000	0,4%
10. Despeses de gestió ARC			1.094.210	4,0%
Subtotal Recollides i Altres			9.443.722	34,5%
TOTAL			27.355.255	100,0%

* El nou import del cànon sobre la disposició del rebuig dels residus municipals per l'any 2013 serà d'aplicació en el moment d'aprovació de la nova Llei de mesures fiscals i financeres. Mentre no s'aprovi la nova Llei, seran d'aplicació els imports definits en la Llei 5/2012, de 20 de maig, de mesures fiscals, financeres i administratives de 12,4 i 5,7 €/tn per dipòsit i incineració respectivament.

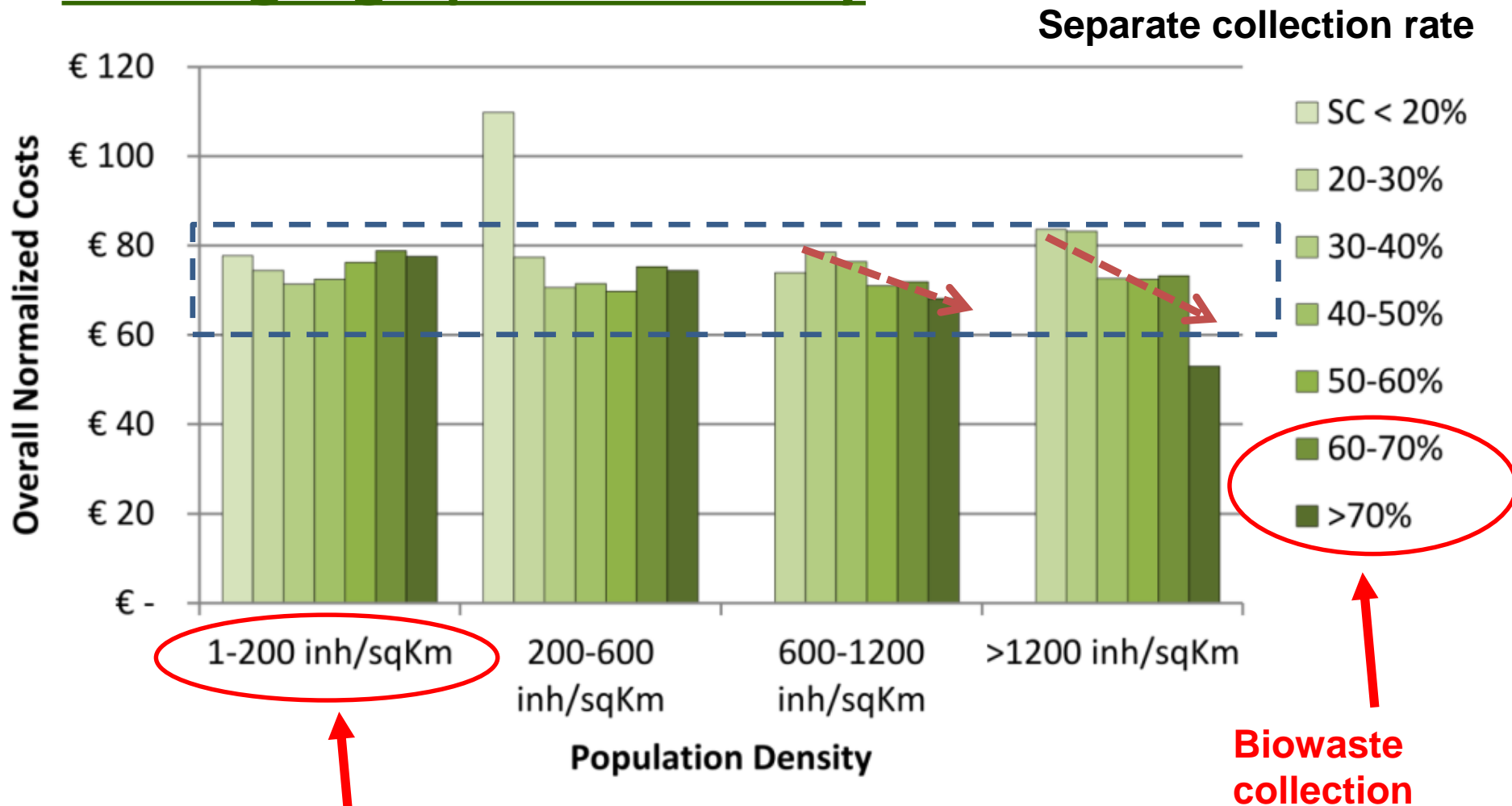


Economics: be careful when comparing data

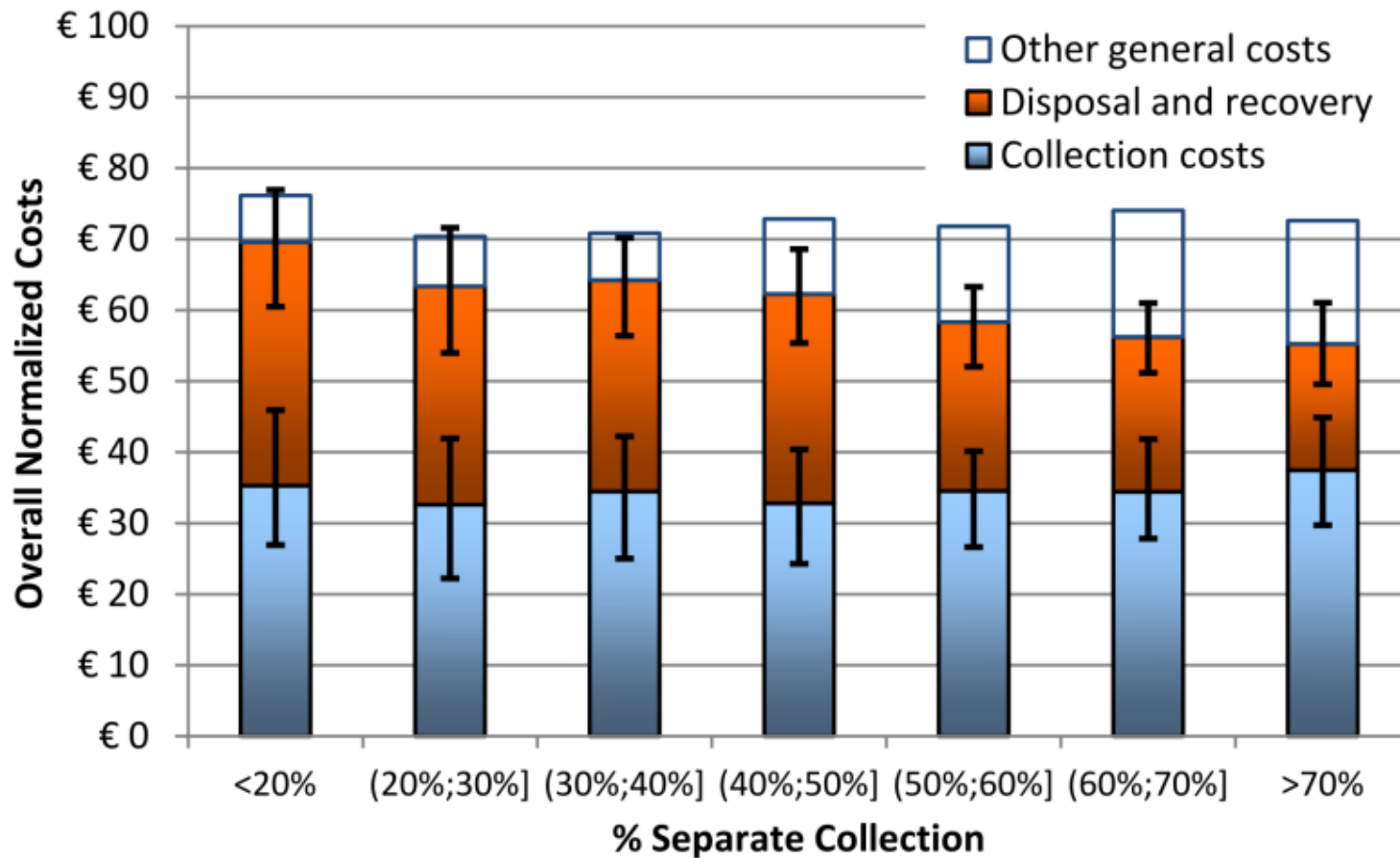
- Compare the overall scheme (collection + treatment, not only collection. €/inhabitant, not €/tonne.
- E.g. Lombardy Region (2010-2014): a new comparison **indicator** was built in order to compare overall costs between **more than 1500 municipalities**, with strong differences in:
 - Collection schemes (e.g. road containers, kerbside)
 - Tourism
 - Presence of non domestic activities producing waste accounted into the urban waste stream
 - Population
 - Population density
 - Waste from road cleaning activities



Costs: geographic variability



Lombardy, overall costs: Low vs. high recycling



Higher recycling (including biowaste)
does not lead to higher costs

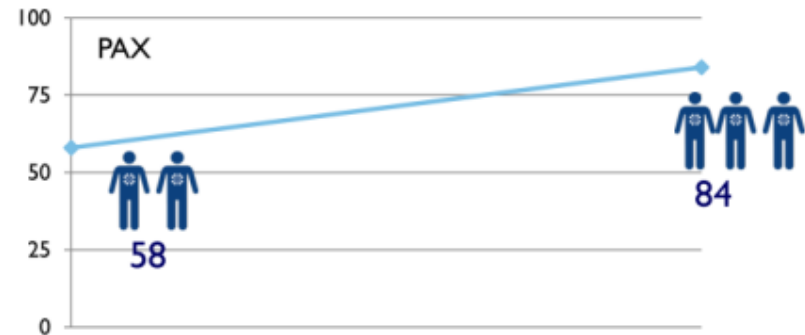


Additional benefits: green jobs



'Green jobs' means growth

Contarina Staff



Total costs
(management + disposal)



Waste quality



Source Contarina (IT), 2014



Additional benefits: The value of compost

- Substitution value of mineral fertilizers
 - €/kg: N = 0,64 , P₂O₅ = 0,55 , K₂O= 0,67, CaO = 0,07; Humus-C : 0,17 (*)
- Currently in Italy we are producing 1,500,000 t/y of compost: substitution value **€ 21,000,000 / year**;
- the value of humic Carbon for the soil accounts at least for **another €20,000,000/year**



27 € / t «not considered»



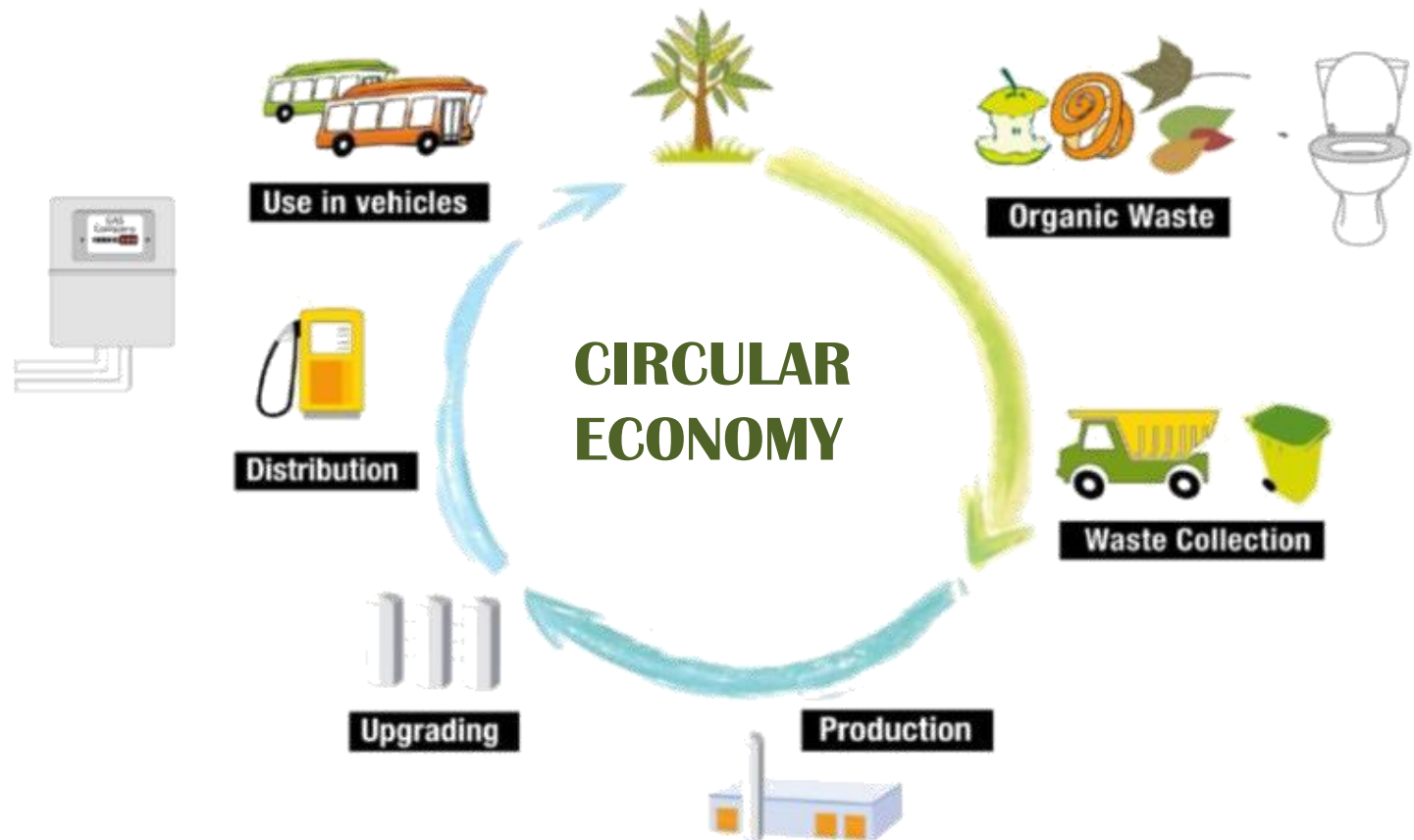
*(Monetary assessment of plant nutrients and organic substances in RAL-quality assured compost and digestion products)

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Additional benefits: food waste -> biomethane for transportation

- Biomethane generated from food waste is potentially sufficient to fuel ALL waste collection vehicles (for all waste fractions)

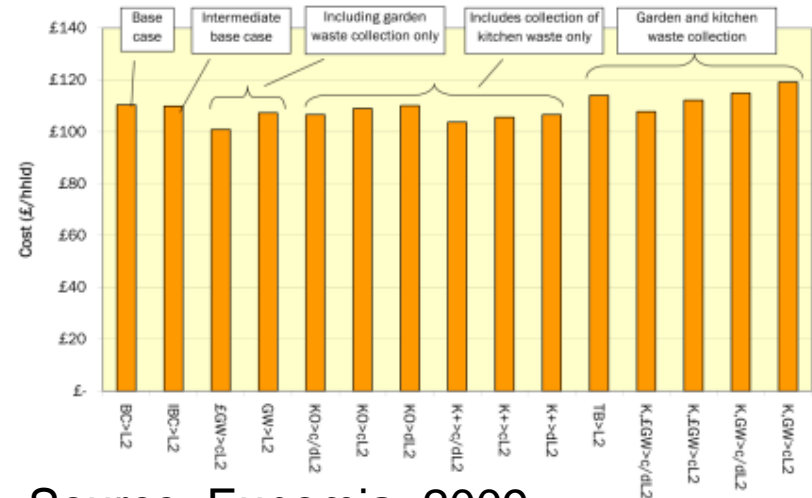


Biowaste collection and cost saving

- 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
 - Use low cost **transfer stations** in rural areas
 - **Reduce collection frequencies** of residual waste to a minimum (alternate weekly) and adapt those of food waste to seasonality



Figure 2: Updated Results Summary



Source: Eunomia, 2009



Conclusions

- TEEP in Article 22 'Member States shall ensure separate collection where technically, environmentally and economically practicable and appropriate' leaves too much room for interpretation.
- This is not necessary, as experience across Europe shows that separate collection of biowaste is feasible in both urban and rural areas, under various geographic and climatic conditions.
- Capitalize on the experience of the frontrunners relying on the ripple effect pushed by simple incentive schemes -> presentation by F. Giró, ARC Catalonia



Thanks

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Agència de
Residus de
Catalunya



ECN | **Biowaste in the
Circular Economy**

Workshop / Brussels / 6 September 2017

Hosted by



**European Committee
of the Regions**

**The contribution of economic tools (landfill & incineration taxes) in promoting the separate collection of biowaste.
The experience of Catalonia. 2003-2017**



**Generalitat
de Catalunya**

Francesc Giró i Fontanals
Director of Strategic Planning
Waste Agency of Catalonia

- **CATALONIA**



- 948 municipalities
- 42 small regions
- 7,522,596 inhabitants
- 22.2 M tourists (2016)
- 31.895 km²
- 27.613 € per capita

- **Catalan Waste Agency**

- Public Agency depending on the Ministry of Planning & Sustainability (Catalonia Government)
- Competences on waste management in Catalonia
- Work areas: planning, legislation, inspection, promotion, subsidies & investment, awareness, etc.
- Linked to:





Strategies used to make possible the progress in the field of waste

Separate
Collection of
Municipal
Waste

1993 → 1.4 %
2016 → 38.5 %



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LEGAL OBLIGATIONS (Laws)

**SEPARATE COLLECTION
TARGETS (Programmes)**

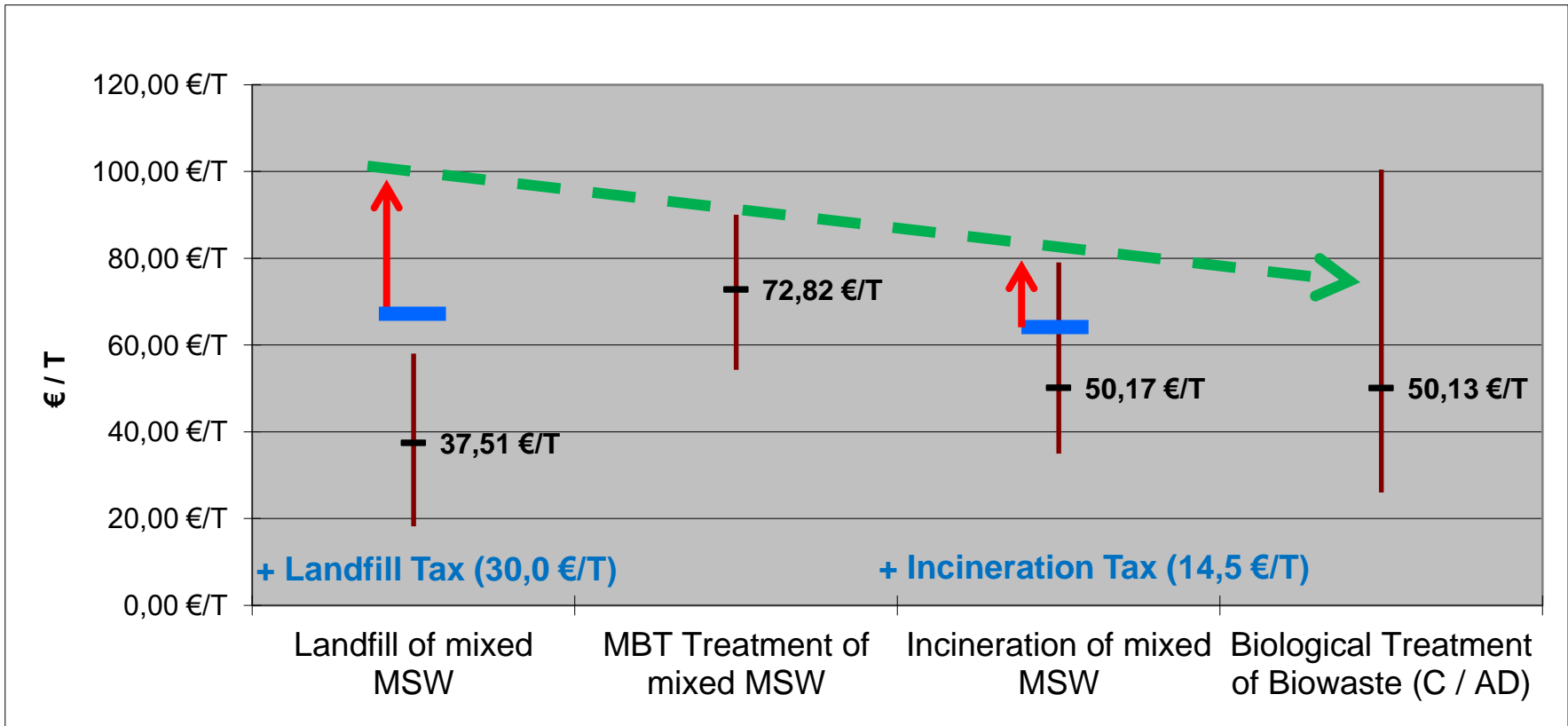
**PLANNING THE NET OF
INFRASTRUCTURES**

ECONOMIC TOOLS

- Economic Support (Subsidies)
- Environmental Taxation
 - Taxes & Taxes Refund
 - Pau as you Throw (PAYT)



Treatment Fees of different waste management options in Catalonia



Number of Plants 2015

23

12

4

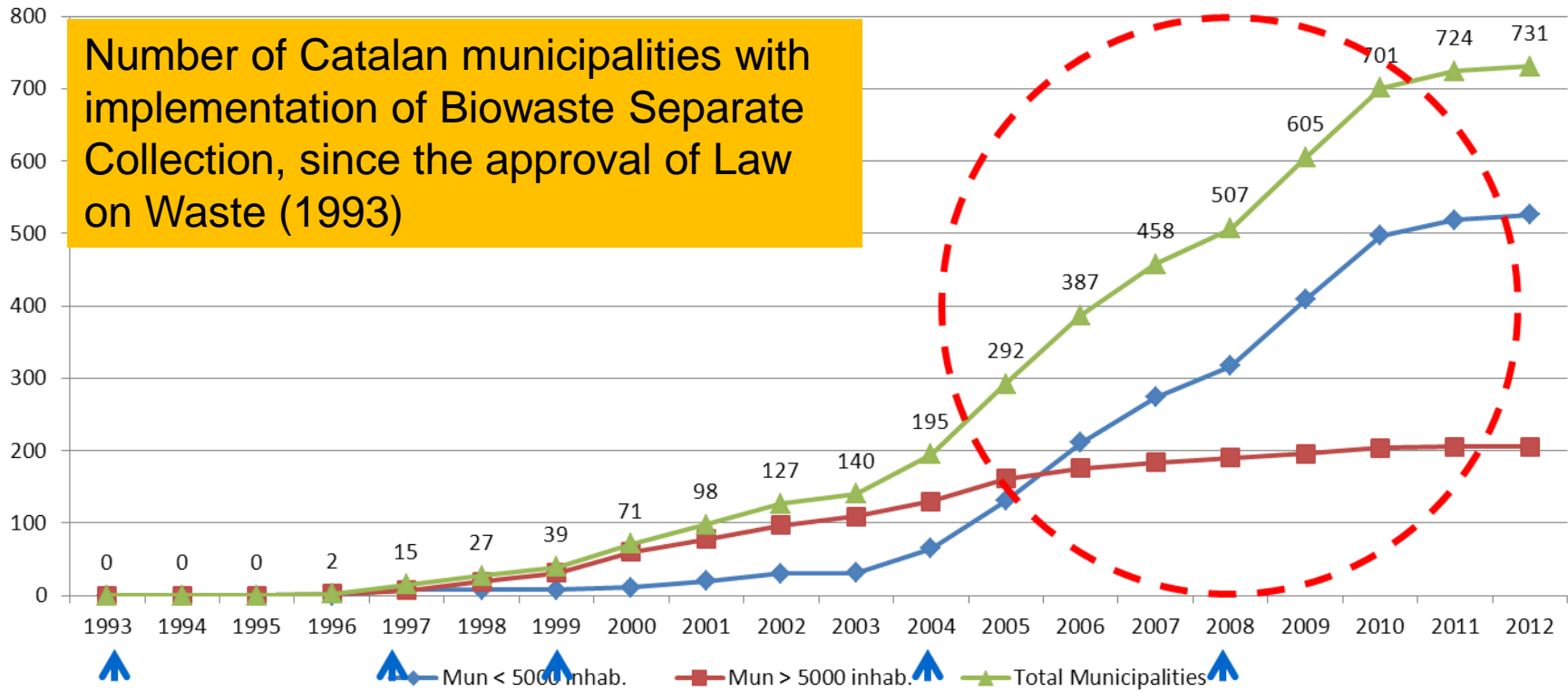
27





The use of Environmental Taxation to Stimulate the Separate Collection

Number of Catalan municipalities with implementation of Biowaste Separate Collection, since the approval of Law on Waste (1993)



Law on Waste

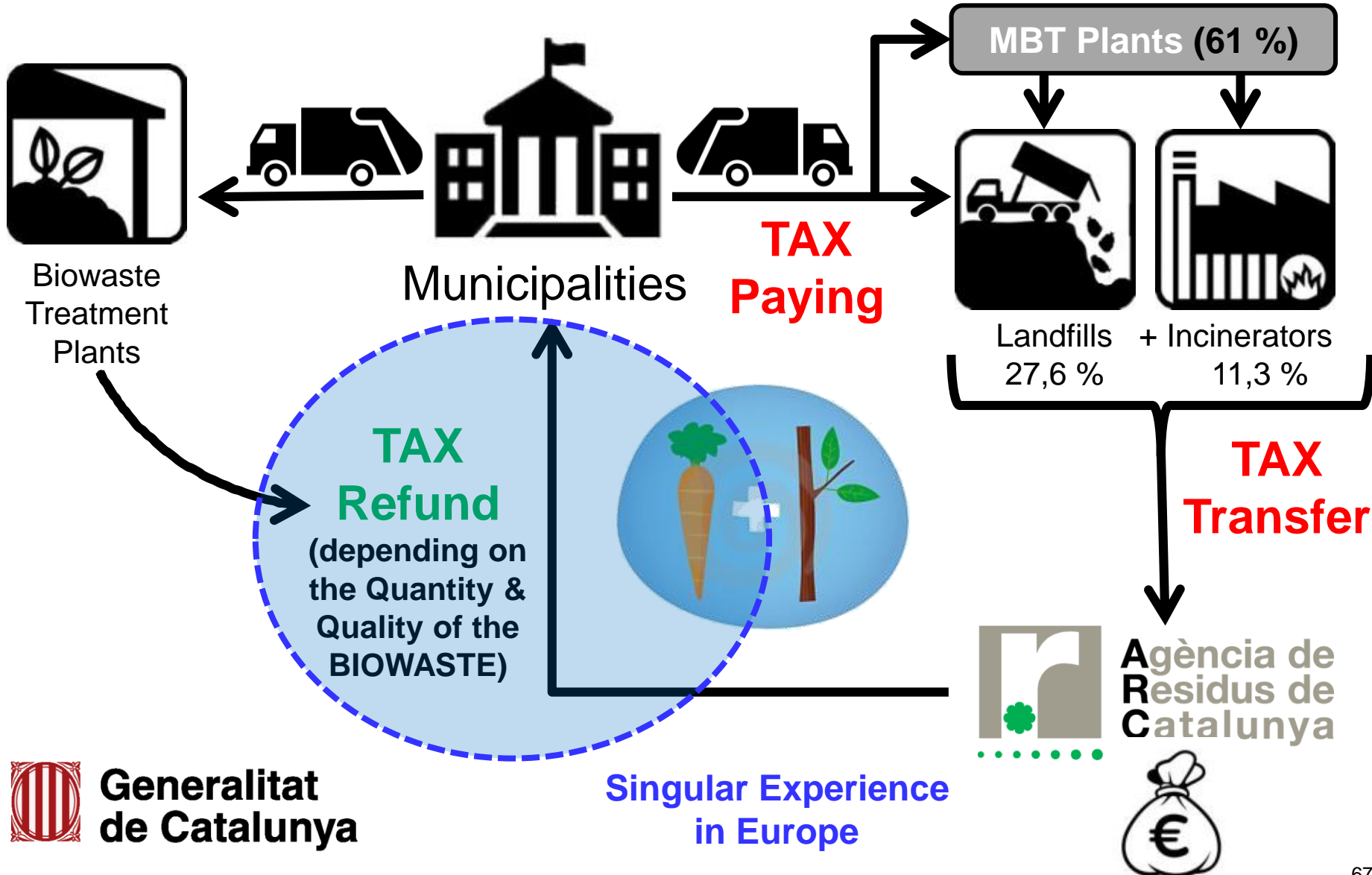
Law on Waste (come into force)

Landfill Tax

Incineration Tax



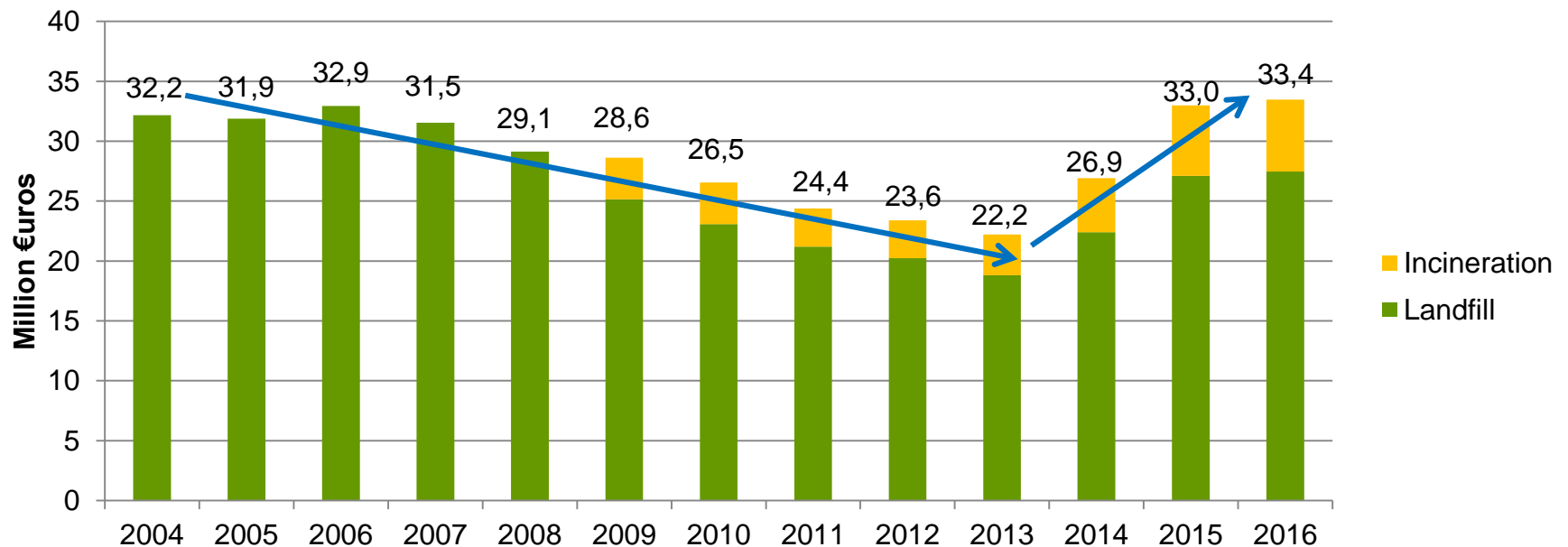
The Sticks & Carrots Strategy. Punishing + Encouraging Policy





Evolution of Landfill & Incineration Tax. 2004 - 2016

Tax Rate (€/T)	2004-2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Landfill Tax	10	10	10	12	12,4	12,4	15,8	19,1	19,1	30,0
Incinerator Tax	---	5	5	5,5	5,7	5,7	7,4	9,0	9,0	14,5



376 M€UR collected since 2004 !



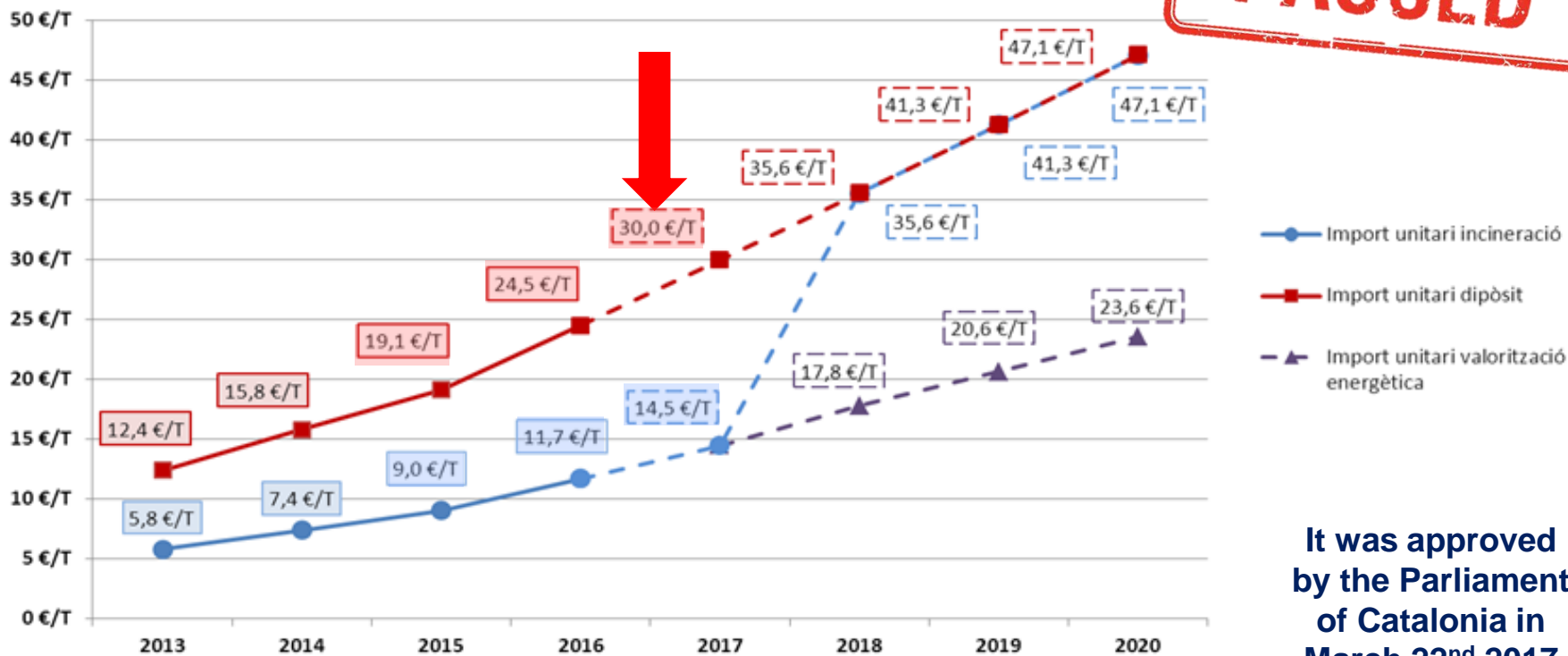
Generalitat de Catalunya

361 M€UR (96%) refunded to municipalities

Reactivating the Environmental Taxing to achieve recycling targets

A large agreement has been achieved between ARC & the associations of municipalities for increasing, in a progressive way, the landfill tax up to near 50 €/t and the incineration tax up to near 25 €/T in 2020.

Evolution of Landfill & Incineration Waste Taxing





Mechanism of operation of Landfill & Incineration Tax and of Tax Refund



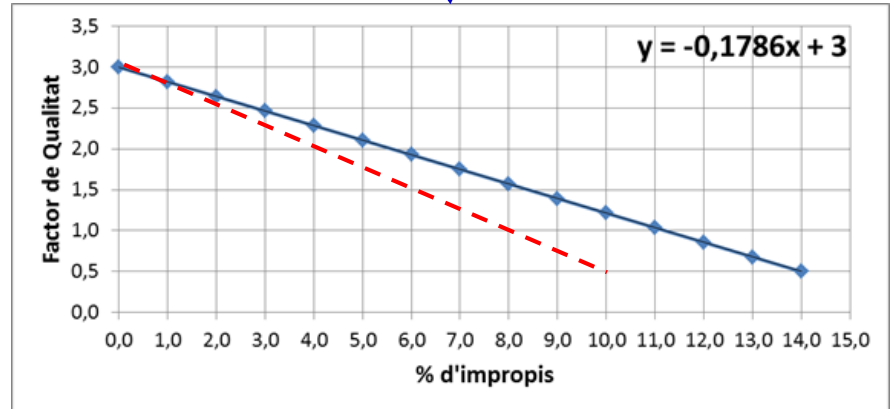
- Tax 30,0 €/T year 2017 (Landfill) (in addition of the fee)
- Tax 14,5 €/T year 2017 (Incineration) (in addition of the fee)

- Guide for local authorities on Law 8/2008, which include the **Criteria for Tax Refund** (yearly reviewed) [2017]:
 - BIOWASTE TREATMENT [34 €/T] (without impurities)
 - BIOWASTE SEPARATE COLLECTION [10 €/T] x f1 x f2
 - Quality Factor (f1)
 - Size Factor (f2)

Urbana	Semiurbana	Rural
1	1,28	1,5

[a] [b] [c]

- [a] > 50,000 inhabitants (23)
- [b] 5,000 – 50,000 inhabitants (187)
- [c] < 5,000 inhabitants (738)





Forecast Balance Income and Returns. Year 2,017

PREVISIÓ DE RETORN DEL CÀNON PEL 2017



INGRÉS	Tn	Import unit.*	Ingrés cànon	% total
Residus Municipals Deposició	1.380.477	30,0	41.414.302	81,7%
Residus Municipals Incineració	638.391	14,5	9.256.665	18,3%
TOTAL	2.018.867		50.670.967	100,0%

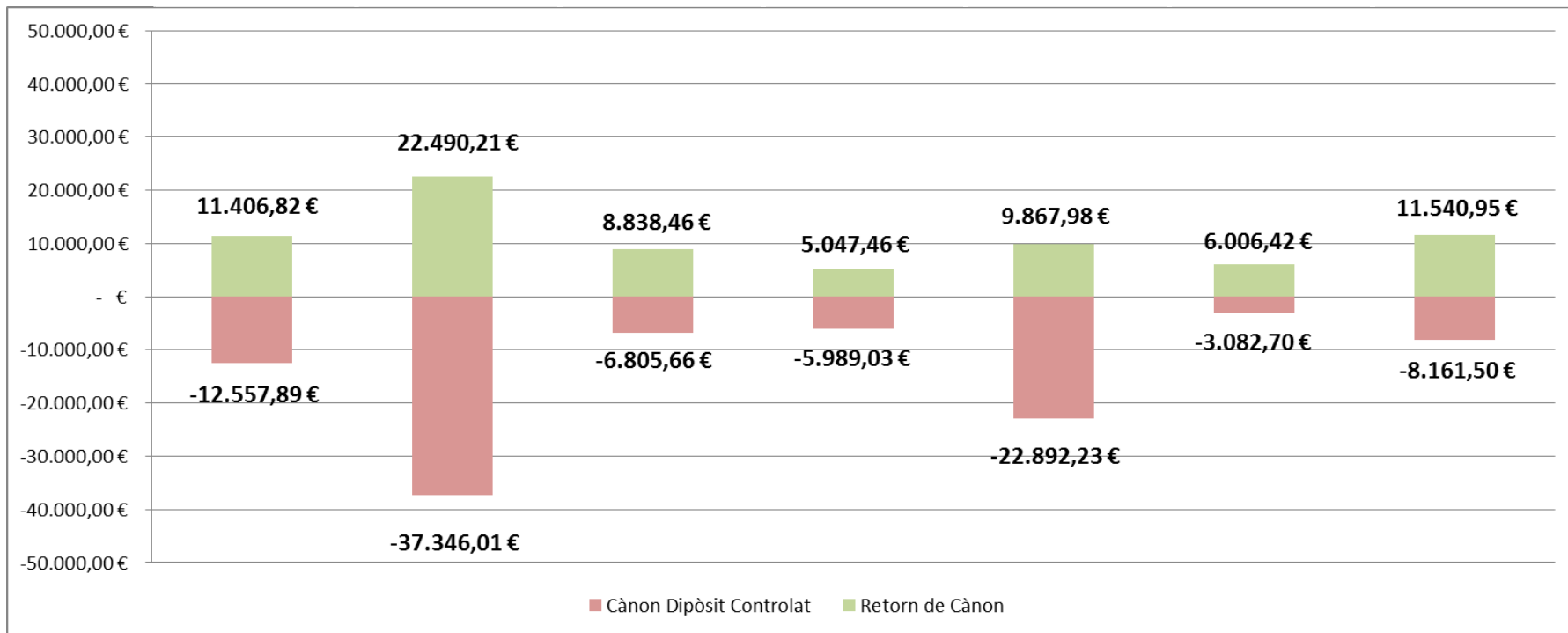
RETORN	Tn	Import unit. €/Tn	Cànon Euros	% total ingrés
1.1 Tractament de la FORM (gestió)	435.000	34,0	13.244.133	26,1%
1.2 Caracteritzacions i analítiques			800.000	1,6%
1.3. Infraestructures			17.843.722	35,2%
2.1. Reducc. Reb. Dipòsit controlat *	530.000	7,0	3.710.000	7,3%
2.2 Reducc. Reb. Valorització energètica *	460.000	7,5	3.450.000	6,8%
3. Impuls i comercialització del compost	70.000	10,0	700.000	1,4%
Subtotal Tractament FORM			39.747.855	77,1%
3. Recollida selectiva FORM	435.000	10,0	5.023.637	9,9%
4. Gestió residus especials a les deixalleries	2.800	500	1.400.000	2,8%
5. Autocompostatge			300.000	0,6%
7. Altres actuacions**			2.172.636	4,3%
8. Despeses de gestió ARC			2.026.839	4,0%
Subtotal Recollides i Altres			10.923.112	21,6%
TOTAL			50.670.967	100,0%





How system affect municipalities? Balance in 7 Catalan municipalities

Municipi 1 3.751 hab. Municipi 2 7.130 hab. Municipi 3 2.026 hab. Municipi 4 776 hab. Municipi 5 5.681 hab. Municipi 6 1.264 hab. Municipi 7 3.136 hab.





How system affect municipalities? Balance in 7 Catalan municipalities

Municipi 1	Municipi 2	Municipi 3	Municipi 4	Municipi 5	Municipi 6	Municipi 7
3.751 hab.	7.130 hab.	2.026 hab.	776 hab.	5.681 hab.	1.264 hab.	3.136 hab.

% Separate Collection

39,9%

37,3%

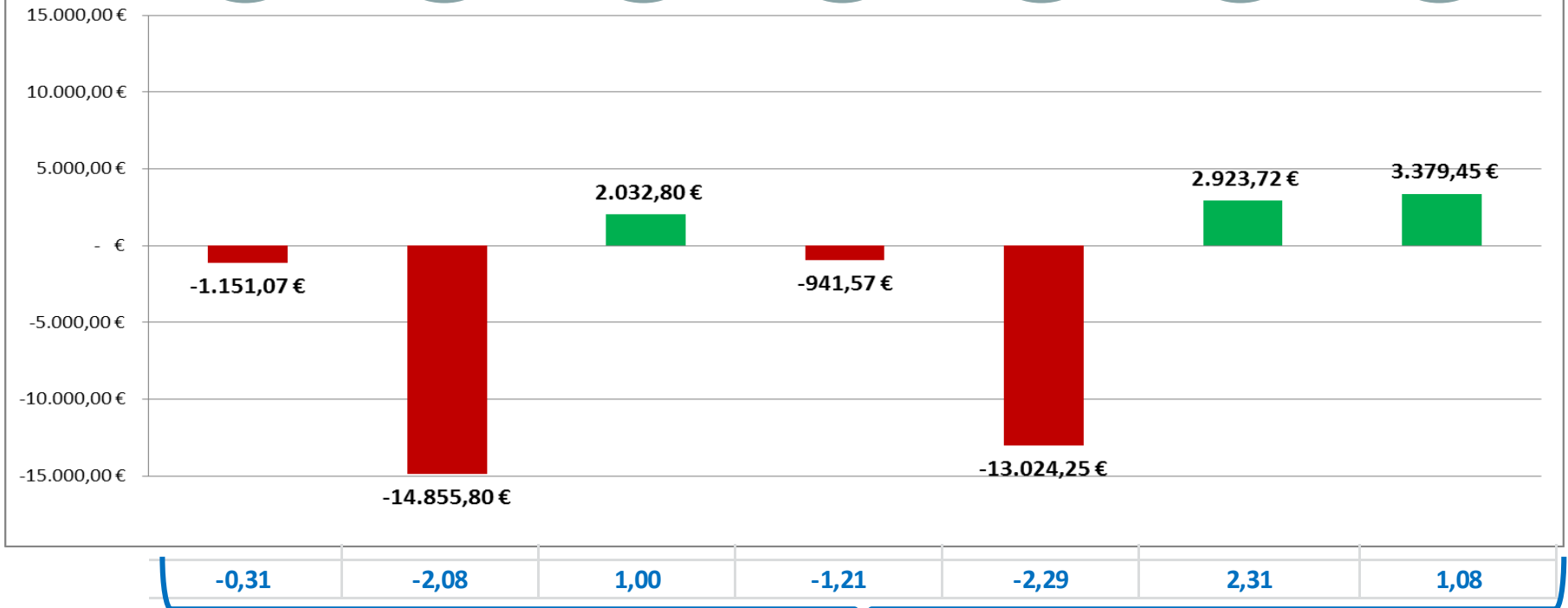
56,0%

34,4%

27,5%

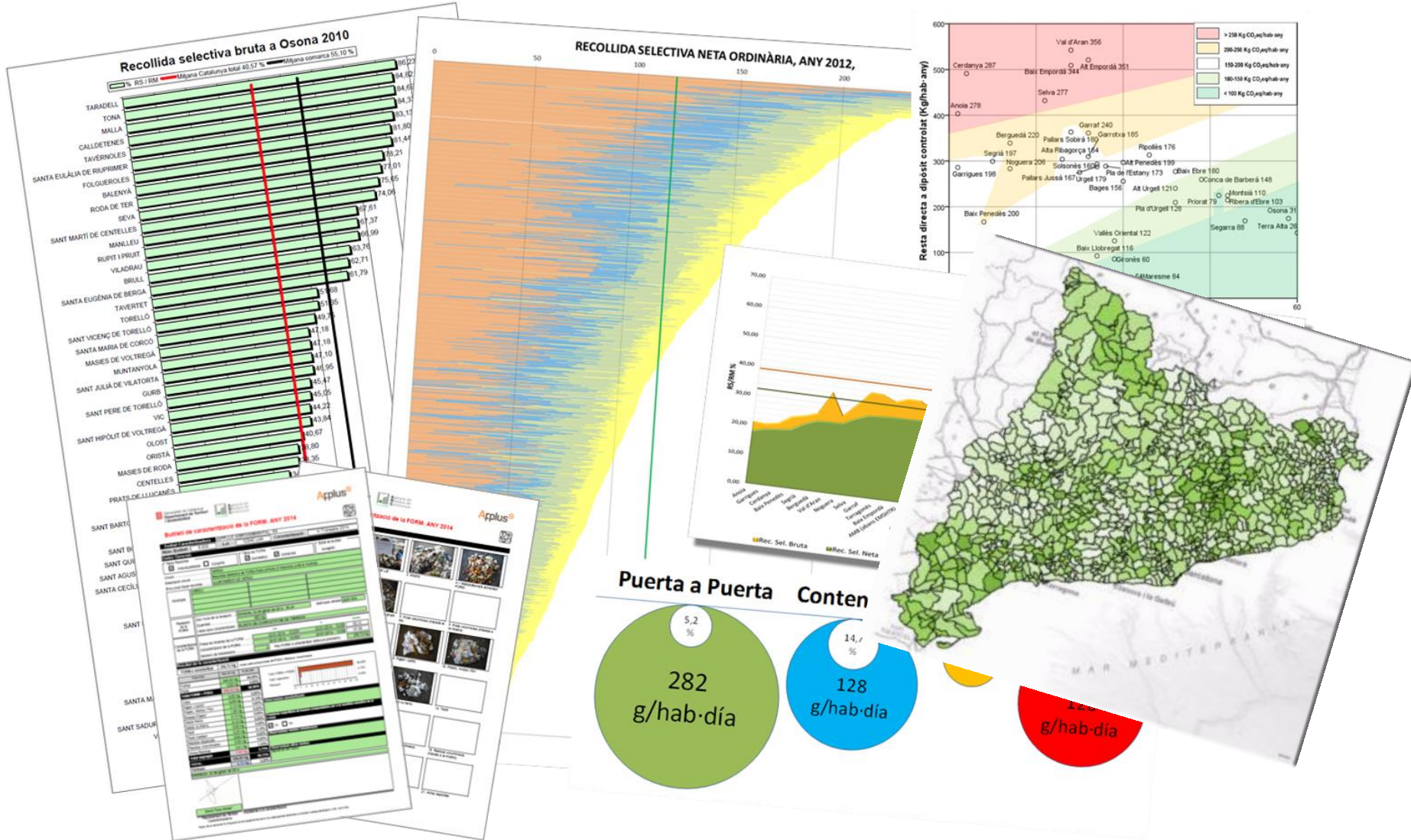
59,3%

59,5%





Information Available



ESTADÍSTIQUES DE RESIDUS MUNICIPALS

Agència de Residus de Catalunya

metodologia



Informació sobre l'obtenció de les dades, els tipus de residus considerats i els indicadors

taules



Consulta en línia de dades de generació i recollida selectiva de residus municipals a Catalunya

gràfics



Selecció en línia de gràfics de generació i recollida selectiva de residus municipals a Catalunya

mapes



Representacions territorials de les dades de generació i recollida selectiva de residus municipals a Catalunya

documents



Recull de dossiers i informes d'estadístiques de residus municipals a Catalunya

Statistics: <http://estadistiques.arc.cat/ARC>

Biowaste Quality: <https://sdr.arc.cat/cform/ListCaracteritzacions.do>



Thank you very much for your attention !
Merci beaucoup pour votre attention !
Moltes Gràcies per la vostra atenció !
Muchas gracias por su atención !

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