



*4th International Conference on
Sustainable Solid Waste Management*



Municipal waste management in remote areas of Spain: islands and rural communities

D. Hidalgo*, F. Corona, J. M. Martín-Marroquín
(*dolhid@cartif.es)

Limassol, 23/25-06-2016

PAVEtheWAYSTE project

- Project funded by EC into LIFE + Program (LIFE14 ENV/GR/000722).
- Aim:
 - To establish an integrated and replicable system for source separation and treatment of municipal waste (MW) in remote areas.
 - The project includes:
 - The design and construction of 9 innovative prototype units for the treatment (fine sorting and compression) of 500 kg MW/day.unit.
 - Raising awareness of more than 2,000 residents and tourist.
 - Recovery of more than 1,600 t of high quality materials.



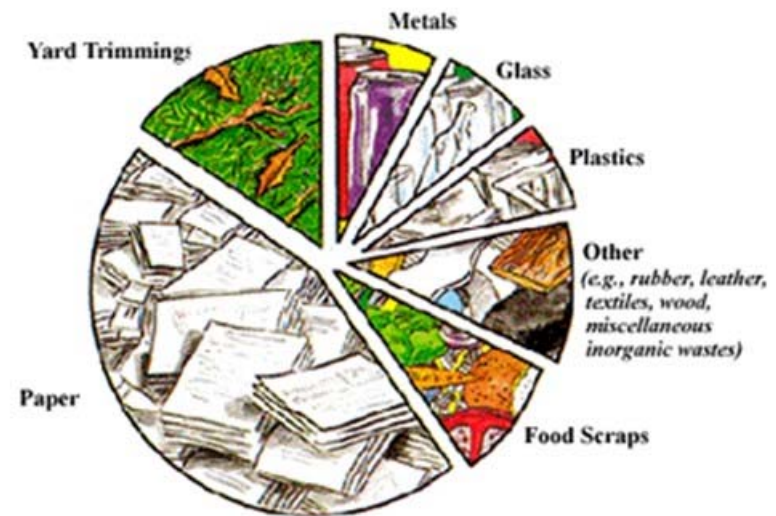


Introduction



Municipal waste

- **Municipal waste** is waste collected by or on behalf of municipalities.
- It includes:
 - household waste originating from households,
 - similar waste from small commercial activities, office buildings, institutions such as schools and government buildings,
 - and small businesses that treat or dispose of waste at the same facilities used for municipally collected waste.



Municipal waste

- Municipal waste is only part of total waste generated (about 10%), but its management and treatment often represents **more than one-third of public sector financial efforts** to abate and control pollution.
- 3 billion tons of waste are annually produced in the EU, of which only 40% is reused or recycled, with the rest being landfilled.



- In the particular case of Spain, material recycling tripled since 2000, but it still covers only 17% of municipal waste.
- Two-thirds of waste in Spain is still landfilled.

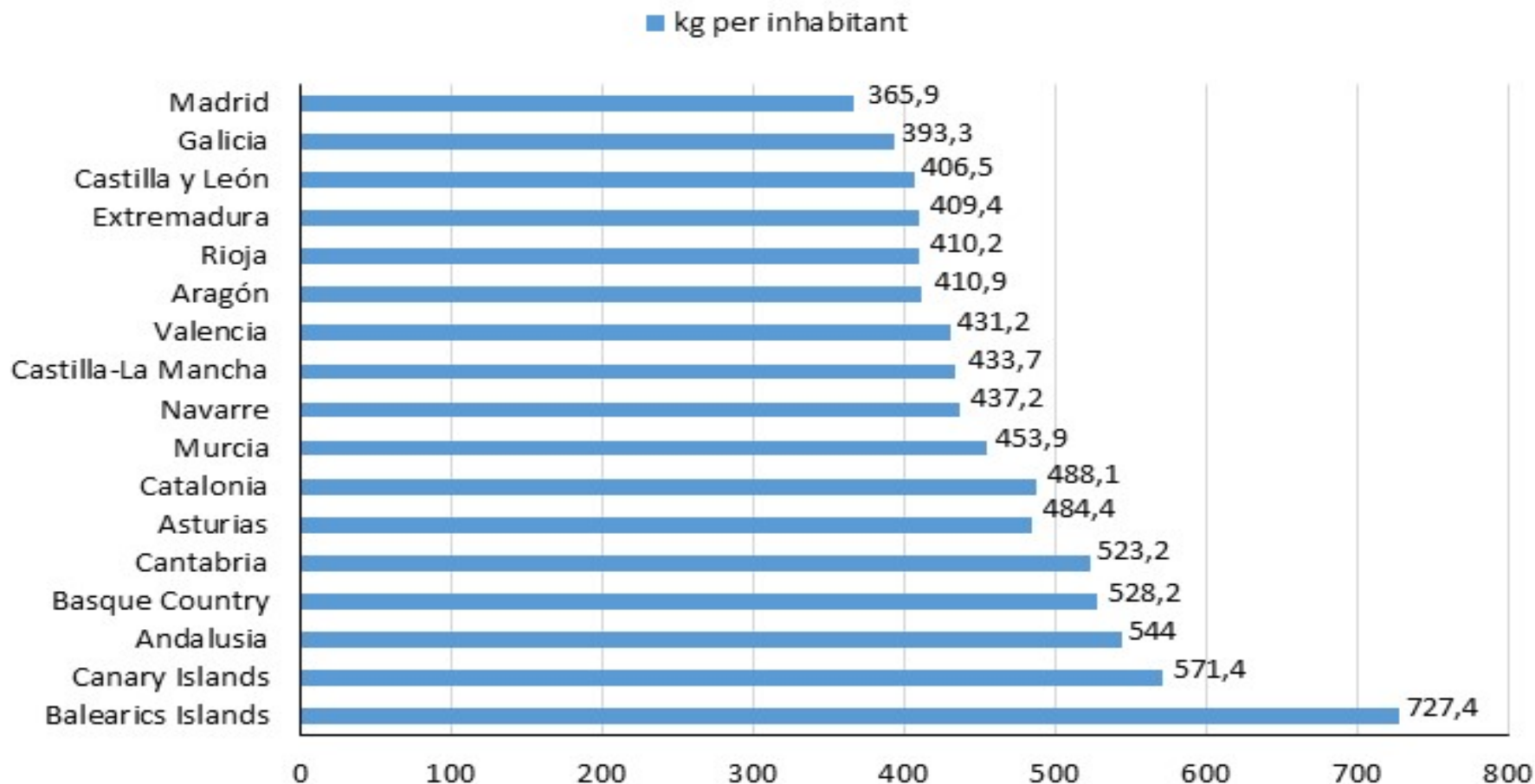


Current situation in Spain

- In 2008 the total amount of municipal waste generated in Spain reached 25.3 Mt (556 kg of waste per capita).
- In 2013 this amount reached 20.9 million (455 kg of waste per capita).
- The result is a decrease, in 5 years, of 17.3%.
- This reduction of waste generation has much to do with the **economic crisis**: a reduction of waste as a result of the shrinkage of economic activity, particularly commercial activity.
- It is easy then to foresee that after Spanish economy recovery the waste generation will return to an increasing trend.

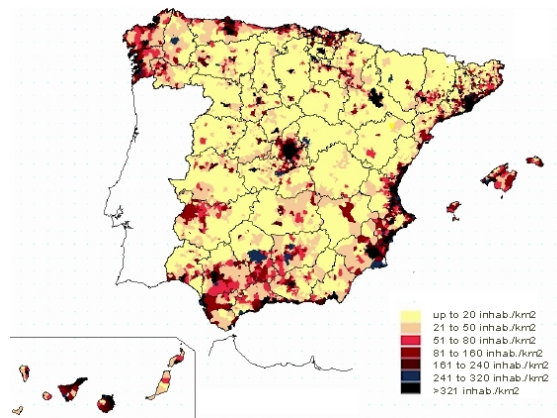


Municipal waste production in Spanish regions (2013)



Current situation in Spain

- The **Spanish population distribution** further complicates municipal waste management.
- Only 0.8% of Spanish municipalities have more than 100,000 inhabitants, whereas 60% have less than 1,000 inhabitants.



- Cities with more than 100,000 inhabitants represent 50% of the population and produce 70% of the waste, while municipalities with less than 1,000 inhabitants represent 5% of the population and produce 3% of the waste.
- Furthermore, 90% of the Spanish territory counts on a population density less than 20 inhabitants per km².



Current situation in Spain

- This dispersion of the population and its concentration in small administrative units give waste collection a more rural character.
- Furthermore, there are rural and island areas whose characteristics cause them to be isolated zones.



Travel Time (Minutes)

- 0 - 45
- > 45

- *"45 minutes travel time to reach an urban center with at least 50,000 inhabitants"* has been selected to classify a commune as "remote" or "close to an urban center".
- According to this definition, 55% of the Spanish territory can be considered as remote.



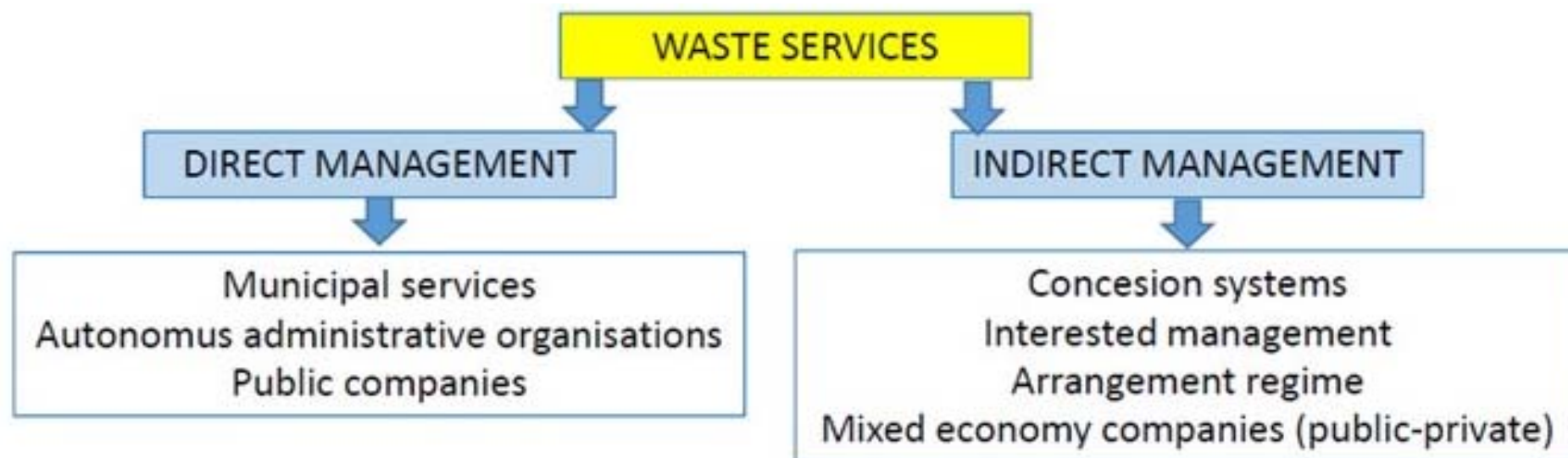


Municipal waste management models in Spain



Provision of waste services

- In Spain 76% of the waste collection market is provided by **private companies** and 24% is under **municipal management**.
- A similar situation occurs in the waste treatment and disposal market where 79% is covered by private companies and 21% is under municipal management.
- The Spanish situation contrasts with the rest of Europe, where in almost 65% of the cases household waste is directly managed by the municipalities.



Waste collection models in Spain

Model 1: 5 fractions	Model 2: Wet-dry	Model 3: Multiproduct	Model 4: 4 fractions + pruning	Model 5: 4 fractions	Model 6: 3 fractions
Glass	Glass	Glass	Glass	Glass	Glass
Paper/ Cardboard	Paper/- Cardboard	Paper/ Cardboard + light packaging	Paper/- Cardboard	Paper/ Cardboard	Paper/ Cardboard
Light packaging	Light packaging		Light packaging	Light packaging	
Remaining fraction	+ Remaining fraction	Remaining fraction	Remaining fraction (including OF)	Remaining fraction (including OF)	Remaining fraction (including OF + light packaging)
Organic fraction	Organic fraction	Organic fraction	Pruning		

*Collection without preselection still exist in some remote areas, but it is an almost extinguished practice.



Waste collection models in Spain

Model 1: 5 fractions	Model 2: Wet-dry	Model 3: Multiproduct	Model 4: 4 fractions + pruning	Model 5: 4 fractions	Model 6: 3 fractions
Glass	Glass	Glass	Glass	Glass	Glass
Paper/ Cardboard	Paper/- Cardboard	Paper/ Cardboard + light packaging	Paper/- Cardboard	Paper/ Cardboard	Paper/ Cardboard
Light packaging	Light packaging		Light packaging	Light packaging	
Remaining fraction	+ Remaining fraction	Remaining fraction	Remaining fraction (including OF)	Remaining fraction (including OF)	Remaining fraction (including OF + light packaging)
Organic fraction	Organic fraction	Organic fraction	Pruning		

Models 1, 4 and 5 are the most popular with a client population of 78%.





Waste management in Spanish islands



Spanish islands characteristics

- Spain has 162 islands, of which about 3.2 million people (6.9% of the Spanish population) live.
- 99.8% of this population is concentrated in the Balearics and the Canaries, which in turn are those that are furthest from the mainland.



- They are **small and limited spaces** with an important touristic sector.
- This results in an equivalent **population** much higher than included in the census.
- **Waste** are one of the biggest problems facing environmental management in the Spanish islands.



Waste management in islands: problems

- The common problems of Spanish islands in relation to waste management are:
 - reduced number of facilities for treatment or disposal,
 - importance of tourism,
 - high population density,
 - limited territory to locate landfills,
 - difficult to achieve economies of scale and
 - transportation of waste to the mainland.
- The islands local governments in Spain has considered necessary to **promote good practices** in relation to urban waste management.



Waste management in islands: good practices



Type of proposal	Specific measures
Proposals on waste prevention	<ul style="list-style-type: none"> - Avoiding food waste - Reducing paper use by businesses and schools - Reduction of packaging - Reusing of goods and products - Minimizing advertising and free newspapers - Actions to promote the repair of goods and products - To boost consumption intangible - To promote the use of reusable nappies
Proposals on waste collection	<ul style="list-style-type: none"> - To assess the implementation of door-to-door collection - Incorporating improvements in the collection in containers model - Specific containers for commercial waste, specifically for large generators
Proposals on waste transfer and transport	<ul style="list-style-type: none"> - In situ pre-treatment of bulky waste - Optimize transport requirements by temporary storage of waste in an intermediate facility between collection and final disposal
Proposals on waste treatment	<ul style="list-style-type: none"> - Promoting home and community composting - To promote treatment facilities at small-scale - Increasing levels of selection of the remaining fraction
Proposals on institutional and administrative organization	<ul style="list-style-type: none"> - To promote pooling / insularity of waste collection services - To improve agreements with recycling organizations (Ecoembes, Ecovidrio,...)
Proposals on legal regulation	<ul style="list-style-type: none"> - To promote the adoption of municipal bylaws regulating the waste collection service - To provide normatively differentiated treatment for commercial waste - To include the mandatory implementation of selective collection of the organic fraction in the regional rules
Proposals on economic instruments	<ul style="list-style-type: none"> - Taxes on products - Taxes on final disposal - Municipal garbage tax - Payment systems for generation - Bonus-penalty systems
Proposals on environmental communication	<ul style="list-style-type: none"> - Training and awareness campaigns



Waste management in isolated Spanish rural communities



Spanish rural communities

- 23% of the Spanish population lives in rural areas.
- Waste production per capita in rural areas does not significantly differ from urban areas.
- The **remoteness** of the facilities hampers the selective collection.



- This factor, together with a **shortage of recycling facilities** in these areas makes most of the waste are dumped without prequalification.
- The situation is aggravated by the fact that there are **no taxes** on the disposal of municipal waste in most of the rural areas.



Waste management in rural communities: good practices



Type of proposal	Specific measures
Proposals on waste prevention	<ul style="list-style-type: none"> - Avoiding food waste - Reduction of packaging - Reusing of goods and products - Actions to promote the repair of goods and products
Proposals on waste collection	<ul style="list-style-type: none"> - To assess the implementation of door-to-door collection - Increasing containerization rates, especially for recoverable fractions - To improve the collection of special waste
Proposals on waste transfer and transport	<ul style="list-style-type: none"> - Implementation of nurse-satellite systems (large capacity compactor trucks (nurse vehicles) receiving waste from collecting trucks (satellite)) - Implementation of loading centers or transfer stations
Proposals on waste treatment	<ul style="list-style-type: none"> - Promoting home and decentralized composting - Increasing levels of selection of the remaining fraction
Proposals on institutional and administrative organization	<ul style="list-style-type: none"> - To promote the provision of services at supra municipal level - To include the specifics of isolated rural areas in the agreements signed with the integrated management entities
Proposals on legal regulation	<ul style="list-style-type: none"> - To promote the adoption of municipal bylaws regulating the waste collection service - To provide normatively differentiated treatment for commercial waste - To include the mandatory implementation of selective collection of the organic fraction in the regional regulations
Proposals on economic instruments	<ul style="list-style-type: none"> - Taxes on products - Taxes on final disposal - Municipal garbage tax - Payment systems for generation - Bonus-penalty systems - Tradeable landfill and incineration permits
Proposals on environmental communication	<ul style="list-style-type: none"> - Campaign on selective collection of organic matter - Campaign on implementation of door-to-door selective collection - Campaign on implementation of self-composting



Examples of good practices in waste management in remote areas in Spain



Case 1: Puigpunyent, Mallorca (Balearic Islands)



Case 1: Puigpunyent, Mallorca (Balearic Islands)

- Pioneer city to implement the selective collection **door-to-door** in the Balearic Islands.
- The introduction had the **support of a group of citizens** organized in the "Support Group to door-to-door collection".



- The use of **compostable bags** for the organic fraction is mandatory, and the City Council distributes them free of charge through retail partners. The stores keep track of the bags delivered, periodically informing the City Council.
- The paper/cardboard and glass are still gathered in containers by "areas of **non-permanent contribution**", which are enabled one day a week.



Case 1: Puigpunyent, Mallorca (Balearic Islands)

- The introduction of the door-to-door system has allowed in this location:
 - Collecting the organic fraction with a very low percentage of unfit material (3.5% on average).
 - Reduce the remaining fraction collected by more than 70%.
 - To increase the collection of light packaging by more than 300%.
 - To increase the collection of paper / cardboard by 166%.
 - To increase the collection of glass over 115%.
 - To reduce the garbage tax by 20%.



Case 2: Riudecanyes, Catalonia



Case 2: Riudecanyes, Catalonia

- The inhabitants of Riudecanyes (little town with 750 inhabitants all year and 1.500 in summer) set a great example of **how individuals can help to improve municipal waste management**.
- The locals collect their waste individually in **small containers**. The greatest achievement of the initiative is that it makes people feel more responsible for the environment. Furthermore, people get immediate feedback if their waste was not collected properly.



- Waste is divided at homes into 3 groups: compostable organic wastes; packing papers; glass and non-compostable wastes.
- With this model selective waste collection increased from 10% to 80%.



Case 3: Argentona, Catalonia

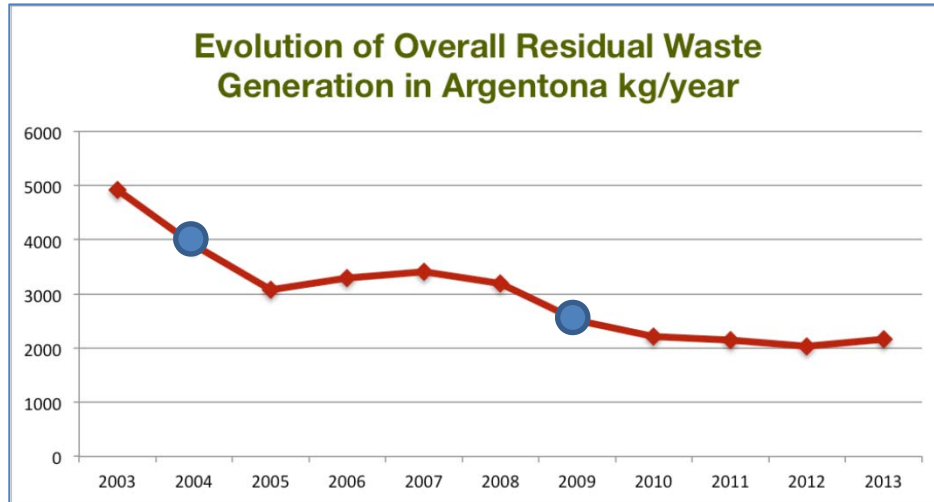


Case 3: Argentona, Catalonia

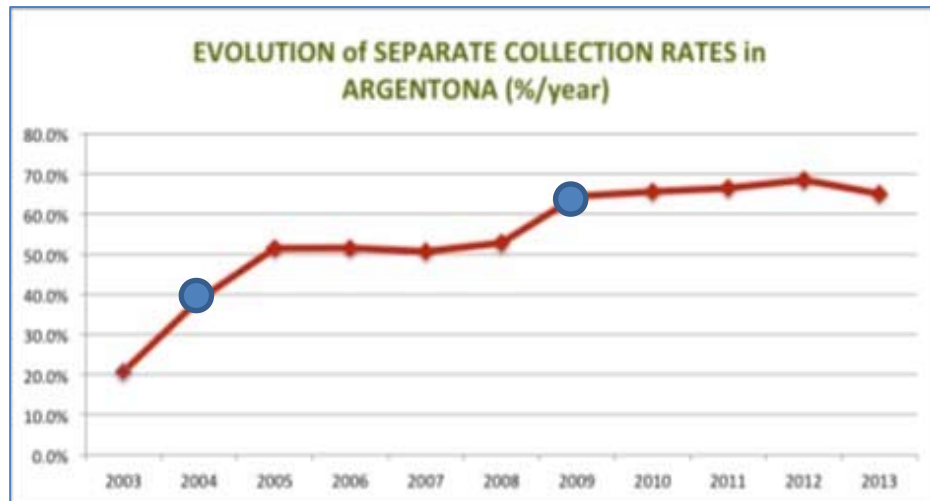
- When the **door-to-door** collection system was introduced in 2004, Argentona more than doubled its recycling rates.
- Later, a **pay-as-you-throw** model for refuse and packaging based on the principle of "who recycles and reduces, pays less", both for households and commercial activities was implemented in 2009.
- Thus the variable part of the **waste tax** depends on waste generation of refuse and packaging. **Standardized bags** of known volume are used as a counter. The use of these bags is mandatory.



Case 3: Argentona, Catalonia



- 2004: introduction of **door-to-door** collection system.
- 2009: introduction of the **pay-as-you-throw** model.





Conclusions



Conclusion

- Innovative municipal waste management is a key driver for resource efficiency,.
- However, for many regions in Europe, especially for those “remote” or “isolated” the optimization of urban waste management is problematic.
- The main challenge here is to move these remote areas up the waste hierarchy towards waste **minimization, recycling and reuse**.



Further information:

**www.pavethewayste.eu / dolhid@cartif.es
Fundación CARTIF, Boecillo, Valladolid (SP)
Tel. +34 983 546504**



Thank you for your attention

