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The challenge of increasing source segregated waste collection in the Centre region of Portugal

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 - Mechanical Engineering, Universidade de Coimbra, Portugal
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Overview

Waste Collection in Central Portugal



Municipality



Zona Centro

ERSUC > 1 million hab. | 36 municipalities

VALORLIS > 200k hab. | 4 municipalities

Representing 11,4% of the Portuguese Pop.

Separate Collection: Glass | Paper | Packaging
(plastics, metals, composites, other pack mat)

Road containers: > 95%

Door-to-door: ± 4%



Different Territories RURAL vs URBAN

Rural areas, small size villages, mountains and dispersed population



Urban areas (affluent, tourism, medium size towns as Aveiro, Coimbra, Leiria, Figueira da Foz)

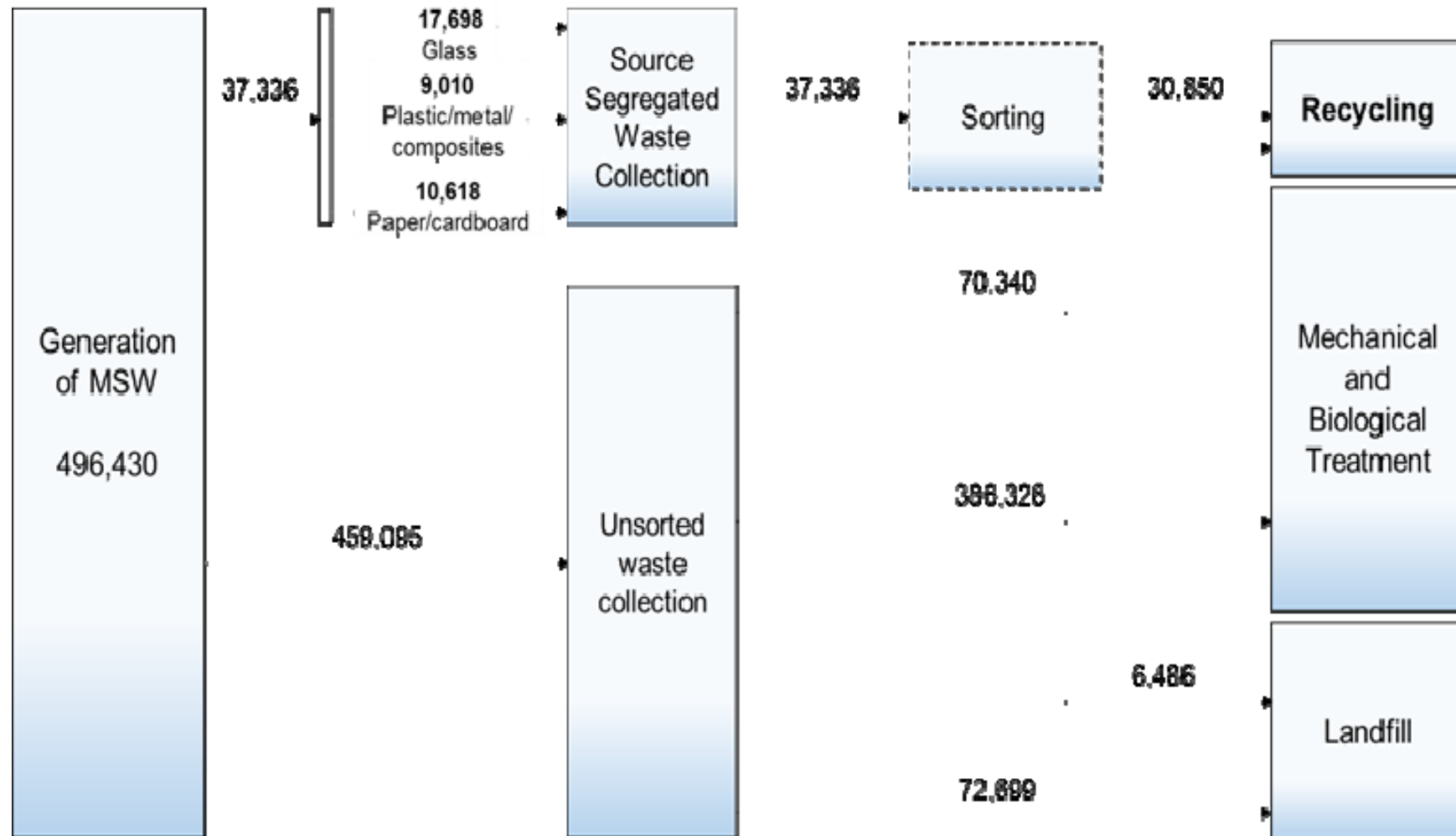


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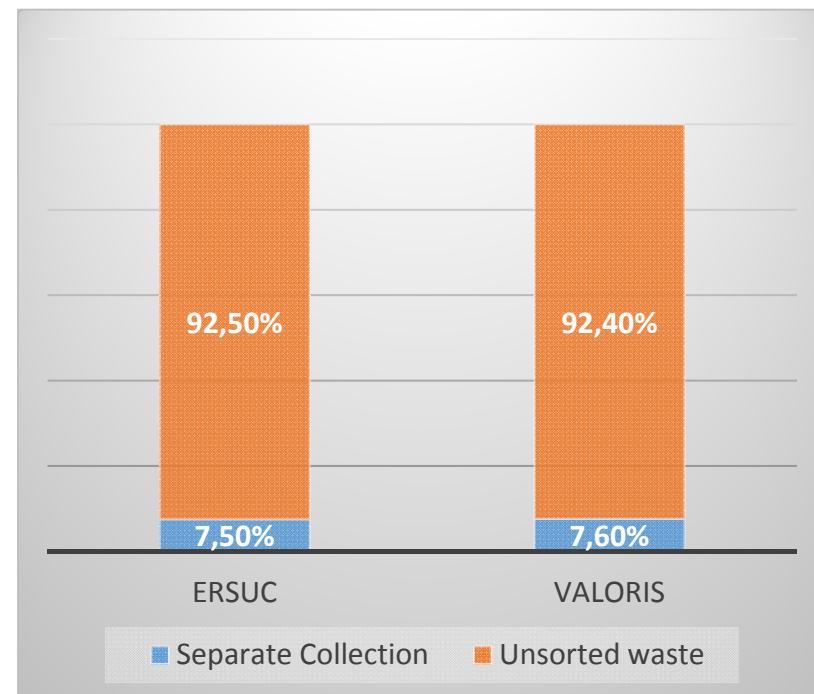
Municipal Waste Management@Central Portugal



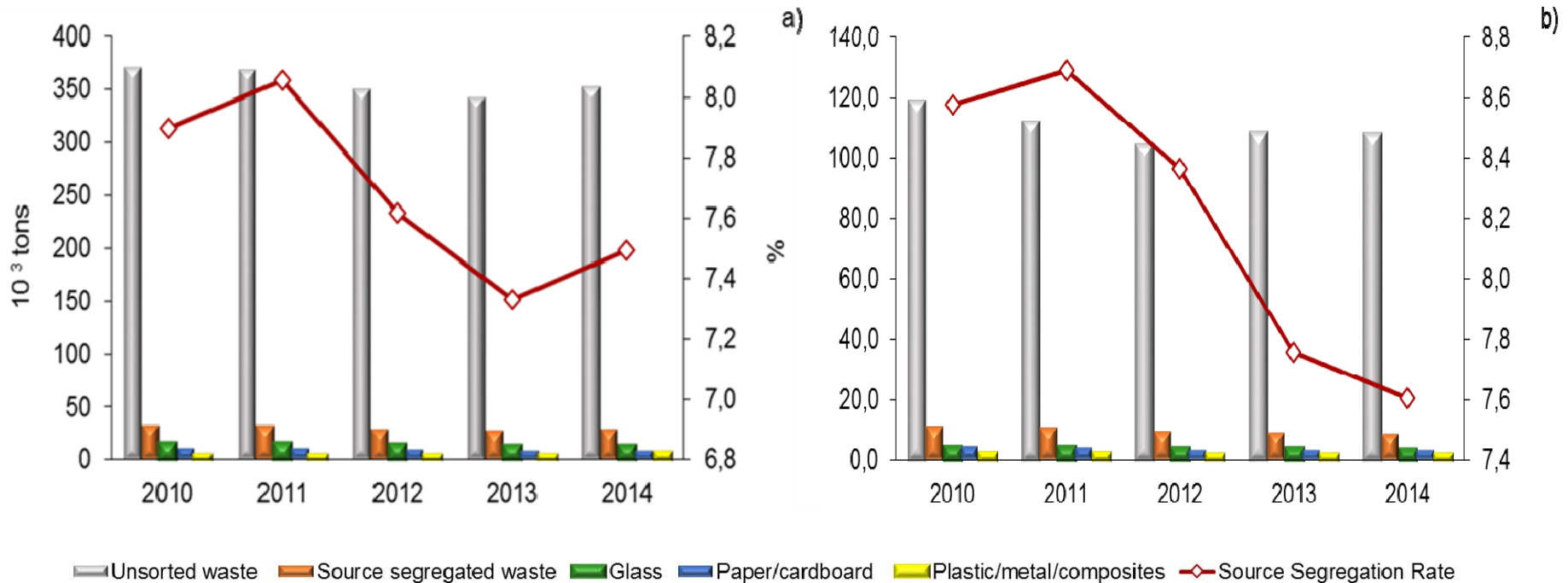
Urban waste source segregation

- ERSUC S.A. : 7.5% source seg. rate considering total waste collected
 - 30.4 kg person⁻¹ year⁻¹
- VALORLIS S.A.: 7.6%
 - 28.8 kg person⁻¹ year⁻¹
- Below the target (PERSU2020):
 - 46.0 kg person⁻¹ year⁻¹ and 42.0 kg person⁻¹ year⁻¹, ERSUC and VALORIS.
- Source segregation negative growth between 2010 and 2014:
 - -5.1% for ERSUC S.A. and
 - -11.3% for VALORLIS S.A

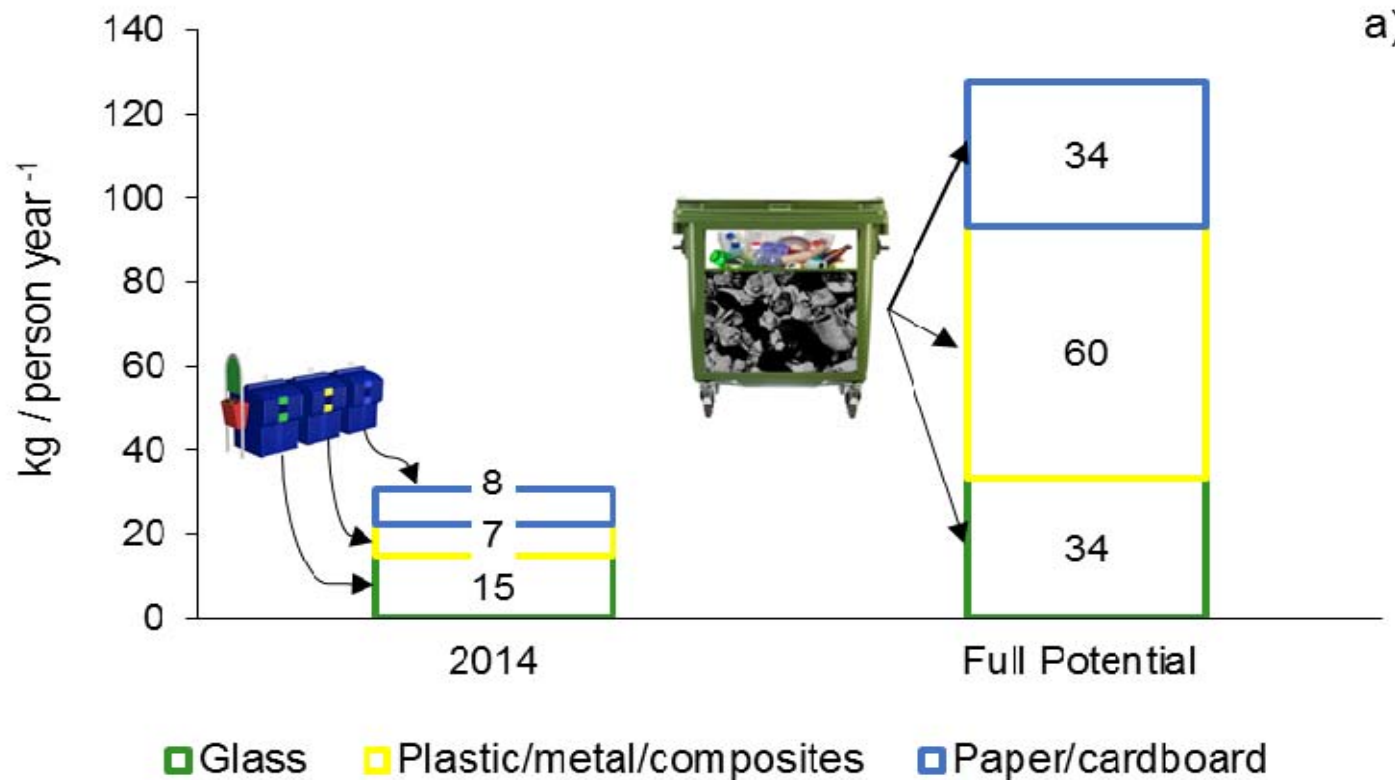
Source segregation def: waste segregated at the point of generation and discarded at a road container aimed at capturing Glass, Paper and Packaging.



Stagnant source segregation and separate collection, 2010-2014



Source separation potential@ERSUC in kg/person year⁻¹



The loss of recyclables into the unsorted waste stream
12.5 million euros a year (estimated, 2014) i.e. loss income to Municipalities

“Push for source separation- ERSUC!”



Casa do Ambiente
Exposição Itinerante

Entre os dias 9 de Fevereiro e 15 de Dezembro de 2014, a exposição itinerante “Casa do Ambiente” foi visitada por mais de 9.000 pessoas e esteve presente em 19, dos 36 Municípios do Litoral Centro. Iniciou a sua atividade no Município de Oliveira de Azeméis, passando por Castanheira de Pera, Murtosa, Anadia, Monforte-o-Velho, Águeda, Coimbra, Mealhada, Ovar, Carriñhede, Vila Nova de Poiares, Albergaria-a-Velha, Pedrogão Grande, Condeixa-a-Nova, Pinheiro, Sotomaior, Ílhavo, Arganil e Aveiro.

Com o principal objetivo de sensibilizar as pessoas para a problemática dos resíduos, nomeadamente para a importância da sua redução e tratamento, nesta exposição esclarecemos as obrigações relativas à separação doméstica dos resíduos e permitimos aos visitantes, a possibilidade de aprender sobre o percurso dos resíduos, desde a sua produção nas nossas casas, até ao seu tratamento. Esta exposição disponibiliza aos seus visitantes, um jogo com um sistema de captura de movimentos e gráficos 3D, que possibilita a um número de até quatro jogadores em simultâneo, escolher a maior quantidade possível de resíduos, tais como as embalagens de cartão/papel, metálicas, de plástico e de vidro.

Também é possível, através do visionamento do filme institucional da ERSUC, perceber como funcionam os Centros Integrados de Tratamento e Valorização de RSU de Aveiro e Coimbra, a lançar desde março de 2012. Existem duas versões diferentes do filme, uma versão infantil e uma versão direcionada para os adultos.

Durante o ano de 2015, a “Casa do Ambiente” continuará a sensibilizar o Litoral Centro, disponível e acessível a todos os Municípios acorrestas, mediante marcação prévia.



MISSÃO RECICLAR

Missão Reciclar ultrapassa 1.000.000 de Lares

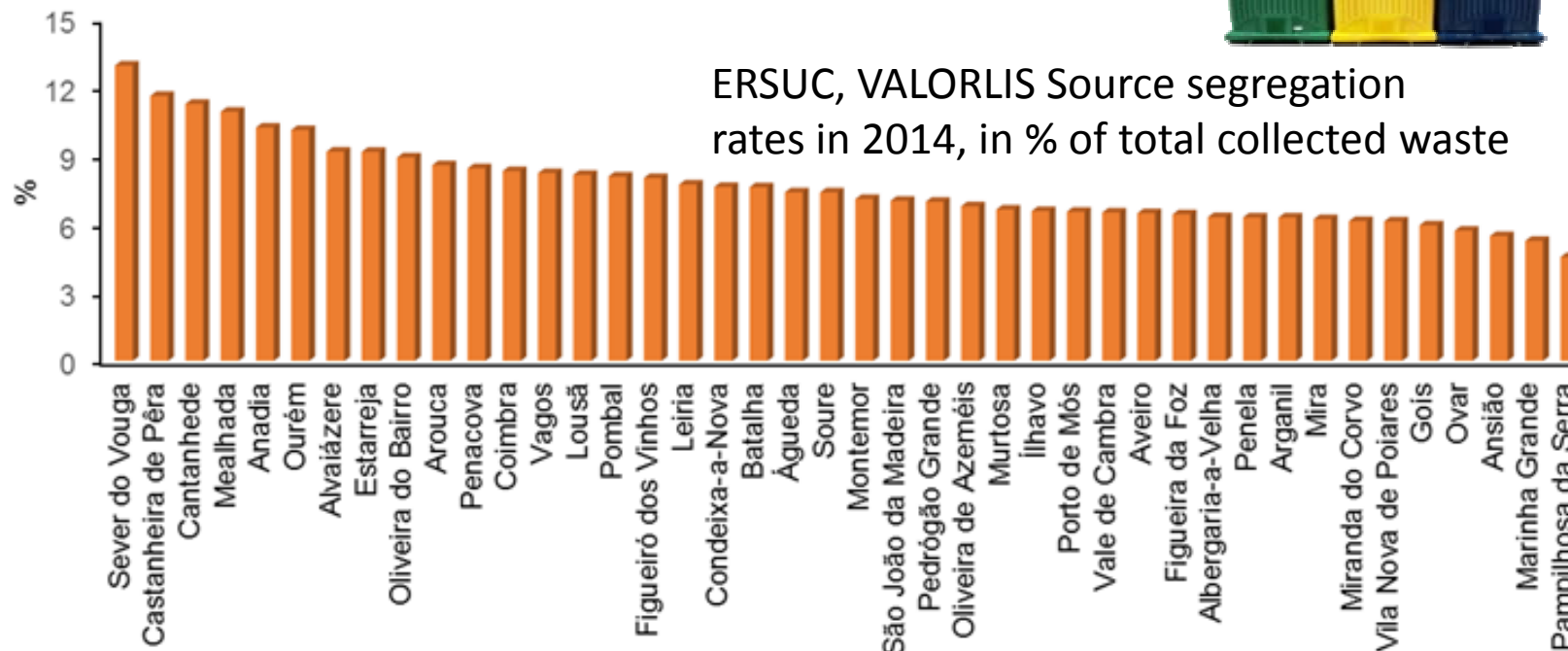
A iniciativa da SOCIEDADE PONTO VERDE (SPV), que pretende contribuir para o aumento da taxa de reciclagem em Portugal visitou metade dos lares a que se propôs no arranque da Missão Reciclar.

Entre os dias 22 e 24 de Julho esteve no Município de Aveiro e entre os dias 29 de Julho e 6 de Agosto, a Missão Reciclar visitou o Município de Coimbra. Em Aveiro bateu à porta de 12.700 lares, cerca de 18 % destes lares abriram a porta e aproximadamente 17 % eram não separadores. Em Coimbra, foram contactados 36.800 lares, 19% dos lares contactados abriam a porta e destes, 24% eram não separadores.

Parameters influencing separate collection

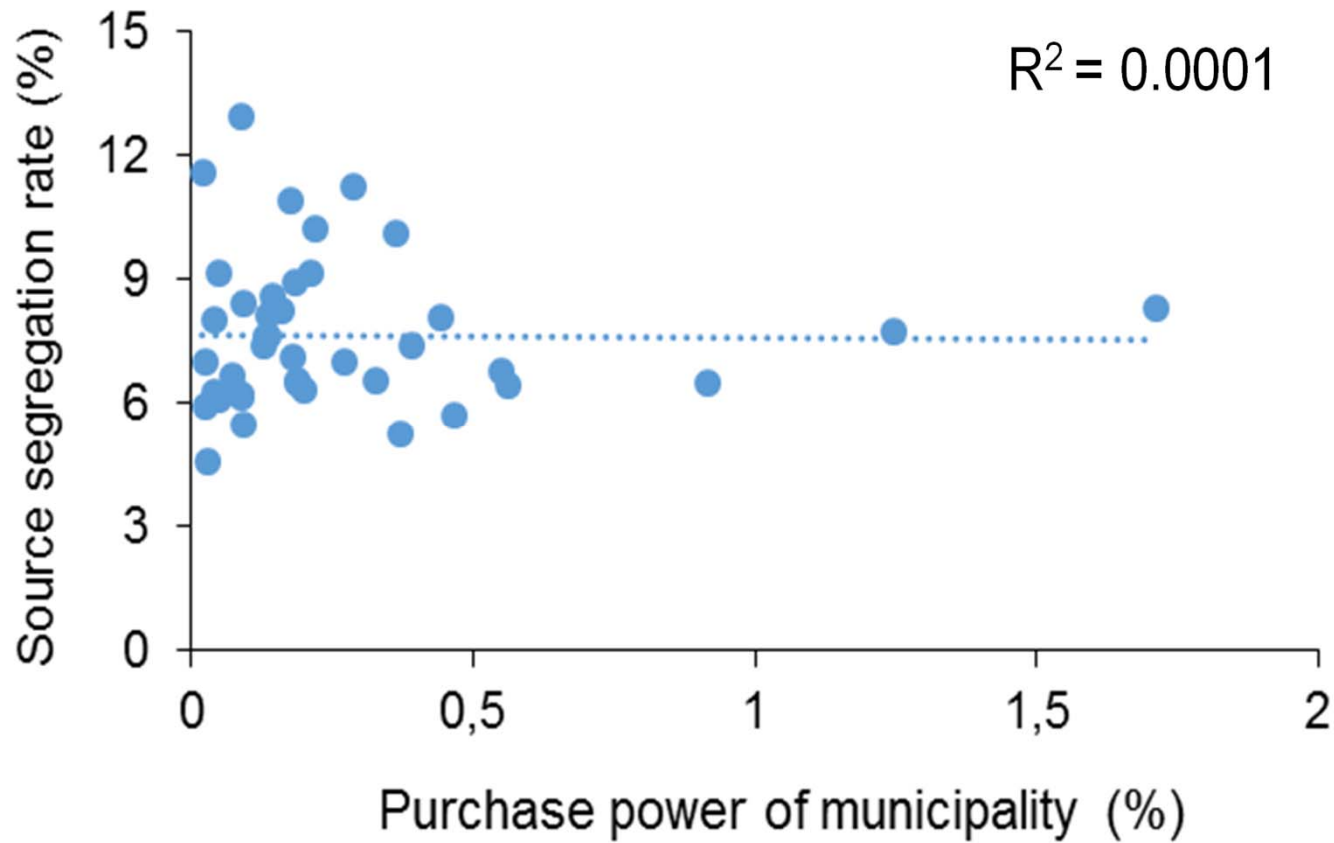
- The source segregation rate is defined in this work as the percentage of the amount of recyclable waste collected separately, compared to the total amount of municipal solid waste collected:
- Source segregation rate (%) = (amount of source segregated waste) / (total amount of municipal waste) * 100
- Source segregation rate was correlated to the following parameters, using Microsoft Office EXCEL 2013:
 - total population (P1),
 - density population (P2),
 - area (P3), purchase power (P4),
 - number of school years attended (P5),
 - number of containers for source-segregated waste collection (P6),
 - container per inhabitant (P7), and
 - number of containers per square kilometre (P8).

Results and Discussion

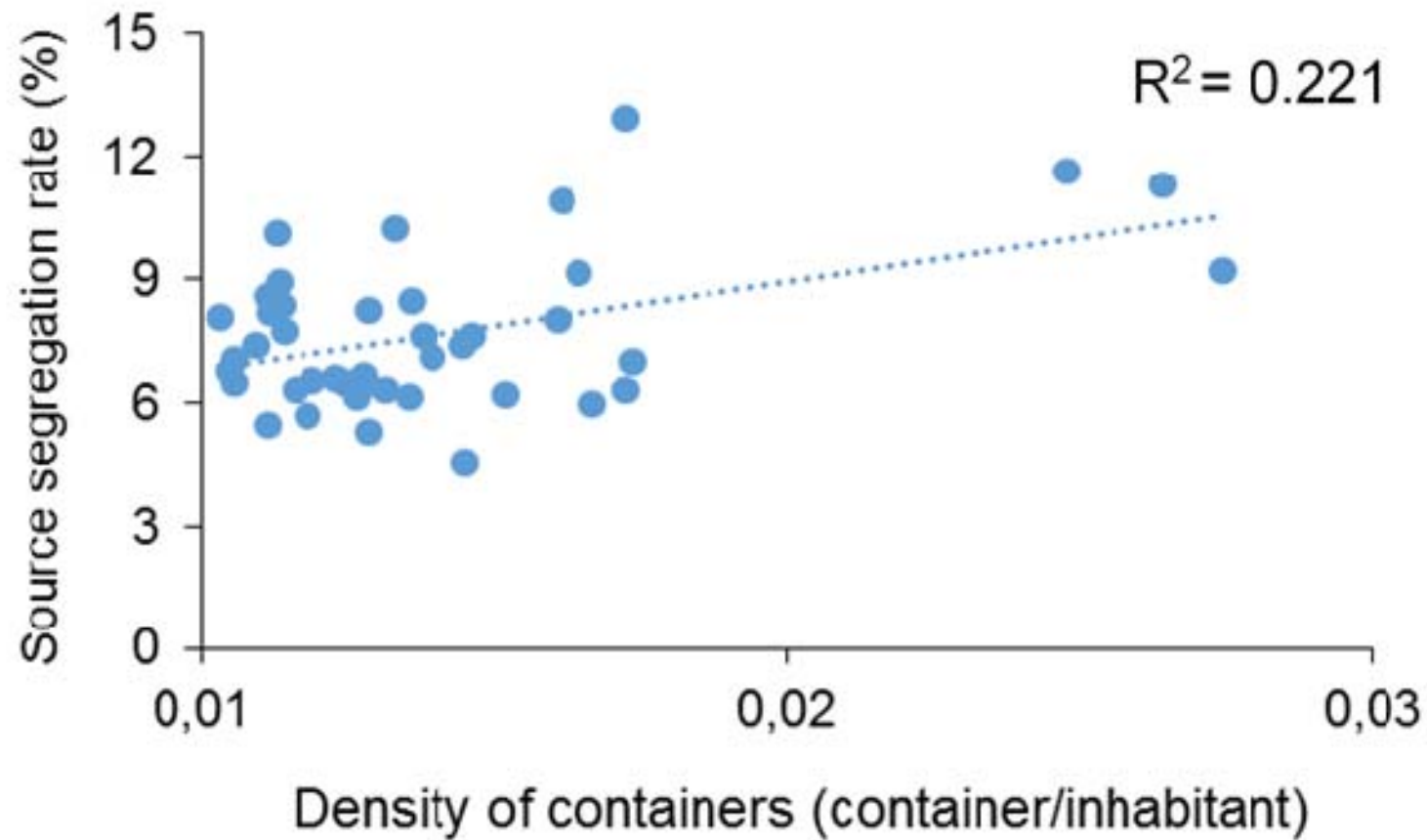


TOP municipality: “Sever do Vouga” (13.0%; 37.4 kg person-1 year-1) pop 12,000. It is remarkable that a small, rural municipality has higher source segregation rate than the most affluent areas such as Coimbra (8.3%; pop. 130,000) or Leiria (7.7%; pop. 126,897).

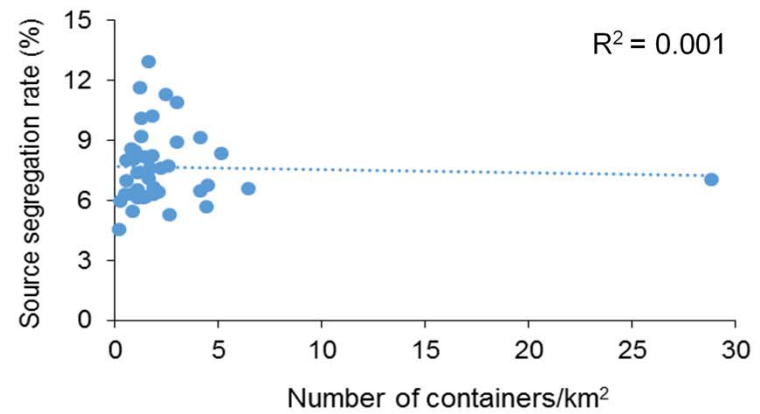
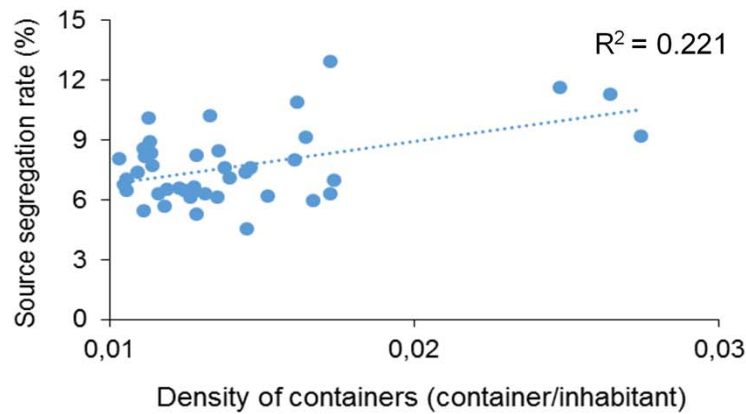
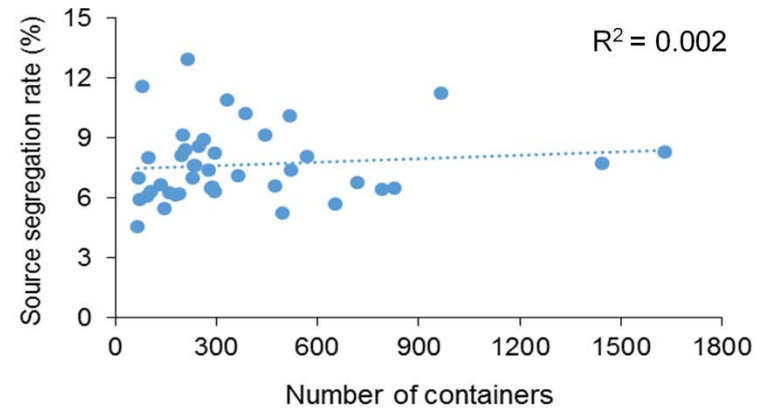
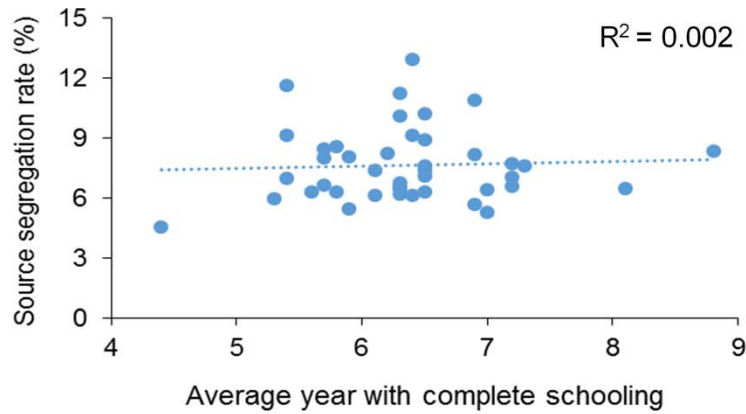
Purchase power of municipality vs. source segregation



Containers density vs. source segregation rate



Study: Other Parameters infl. source segregation results



Discussion

- ERSUC and VALORIS have a **low “recycling”** performance.
- A correlation between source segregation rate and different parameters (*total population, population density, area, purchase power, number of containers, number of containers per km²*) was investigated, **but none of the analysed parameters influenced significantly source segregation rates.**
- **Road containers** are the “only” collection method at ERSUC+VALORIS and are **not efficiently capturing materials, in both affluent municipalities and rural ones.**
- **Is there enough data? How accurate is it** (potential for source separation; road containers collection weight precision)?
- Are other factors influencing source separation ?



Conclusions and recommendations

1. Currently in **Portugal source segregation** aimed at “recycling” is dependent only on **sense of civic duty**. However, this model should be questioned as recycling rates are poor (14% average national level, source, INE – National Statistics Institute, 2014)
2. The results obtained showed that **there is still potential** for improvement within waste management at ERSUC and VALORLIS.
3. **Current collection of recyclables, exclusively with road-side containers** (collective system; anonymous), is not effective in reaching a higher collection rates.
4. **Improvements are required** in order to achieve national targets and EU requirements – Waste Framework Directive.
5. **Further studies should assess the primary data accuracy** at municipal and intermunicipal level examining which factors explain why affluent and richer regions source segregate as much as rural poorer areas.

Thank you !



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