Waste Collection and Treatment in Austria
Secrets of Effectiveness

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Walter Hauer
Questions asked

1. What is the waste management and recycling system in Austria and how it was created?
2. What are the current pros and cons of the system (we need a systemic description, with mass balances, recycling rates etc.)
3. Cost issues
4. How the system fits to the demographic, economic, spatial and social conditions
5. Key-lessons learnt from the development of your system that could be useful for Greek municipalities too
Secrets of Effectiveness
In Very Short Words

- Scarce Ressources for Disposal („state of emergency“)
  - Late 80’s beginning 90’s
  - Exorbitant prices for disposal
    (EUR/t 220 in 1990)
- Ban of landfilling untreated Waste combined with landfill Tax up to EUR/t 84,-
- Frequent Measurement of Waste Composition
- Efficient Reporting System
Historical Development of Quantities of MSW in Austria

Day: 2016

Scarce resources for disposal

“state of emergency”

Intense public discussions

Waste disposed

Waste from households total

Other Recyclables

Packagings
(Plastics, Metals)

Biowaste

Glass

Paper

Bulky waste

Residual MSW

Waste diposed

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Quantity and composition of residual MSW in Austria, 1991 and 1998

Separate collection of Paper/Cardboard and Biowaste can deliver the highest contribution to the reduction of residual MSW—quantity
Key Driver for Avoiding Landfilling

- Ban for Landfilling Waste with an ignition loss of more than 5%
- Ban for landfilling biological treated waste with a gross calorific value of more than 6,000 kJ/kg
- Accompanied with a Landfilling Tax of EUR/t 84,-
Typical Waste Collection Site

- Building: app. 200m²
- Hazardous waste
- Personal Sanitär EDV

- Traffic Area:
  - Container alongside a Ramp under roof

- Check In
- Entrance
- Exit

- Glass Textiles
- RM Gelber Sack Bauschutt Kühlgeräte
Typical Collection Infrastructure

Kerbside Collection

- Plastic Packaging
- Residual MSW
- Biowaste
- Paper

Decentral Collection Sites

- Glass
- Metals
Waste Collection in Towns
Rates of separate Collection Municipal Waste

<table>
<thead>
<tr>
<th>Category</th>
<th>Rates of separate collection, app.</th>
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</thead>
<tbody>
<tr>
<td>Paper</td>
<td>70%</td>
</tr>
<tr>
<td>Glass</td>
<td>82%</td>
</tr>
<tr>
<td>Metal Packaging</td>
<td>43%</td>
</tr>
<tr>
<td>Plastic Packaging</td>
<td>52%</td>
</tr>
<tr>
<td>Compound Beverage Packaging</td>
<td>56%</td>
</tr>
<tr>
<td>Other Compound Packagings</td>
<td>24%</td>
</tr>
</tbody>
</table>
Cluster-Analyses of Regions

Cluster 1 (28)
Cluster 2 (31)
Cluster 3 (26)
Cluster 4 (13)
Cluster 5 (1)
Cluster – relevant for Waste Management?
Quantity of residual MSW

<table>
<thead>
<tr>
<th>Cluster</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
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<tr>
<td>Einwohner</td>
<td>1.550.774</td>
<td>1.964.046</td>
<td>2.002.578</td>
<td>1.188.779</td>
<td>1.724.381</td>
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<tr>
<td>Anzahl Bezirke (99)</td>
<td>28</td>
<td>31</td>
<td>26</td>
<td>13</td>
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<tr>
<td>Restabfallmenge [kg/EW.a]</td>
<td>109</td>
<td>121</td>
<td>130</td>
<td>214</td>
<td>303</td>
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</table>

Without Vorarlberg

Ohne Vorarlberg
Glass-Packaging Collection Rate by Type of Collection

Cluster 1
Cluster 2
Cluster 3
Cluster 4
Cluster 5
Glass-Packaging Collection Rate by Cluster

getrennte Sammlung Glas-VP

Cluster 1: 91%
Cluster 2: 89%
Cluster 3: 90%
Cluster 4: 79%
Cluster 5: 57%
Cluster A: 82%
Collection types for Glass-Packaging

Findings Glass-Packaging:

• No signifikant differences in the collection rate between different types of containers – though the density of collection sites is different

• Fewer impurities with closed Containers
Metal-Packaging Collection Rate by Type of Collection

![Bar chart showing metal-packaging collection rate by type of collection with clusters 1 to 5.](chart.png)
Metal-Packaging
Non-Metals by Type of Collection
Collection Rate for Metal-Packaging

getrennte Sammlung Metall-VP netto

Additionally collection at recycling centers together with scrap
Quantity of Metal-Packaging

<table>
<thead>
<tr>
<th>Cluster</th>
<th>A</th>
<th>Gesamt [t]</th>
<th>im Restabfall [t]</th>
<th>getrennt gesammelt [t]</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td></td>
<td>6.500</td>
<td>2.400</td>
<td>4.100</td>
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<td>2</td>
<td></td>
<td>9.300</td>
<td>3.300</td>
<td>6.000</td>
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<td>3</td>
<td></td>
<td>9.700</td>
<td>3.100</td>
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<td>4</td>
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<td>6.100</td>
<td>3.800</td>
<td>2.300</td>
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<tr>
<td>5</td>
<td></td>
<td>11.400</td>
<td>9.400</td>
<td>2.000</td>
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<tr>
<td>A</td>
<td></td>
<td>43.000</td>
<td>22.000</td>
<td>21.000</td>
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kg/EW

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Contribution of different Methods for Metal Separation – Monitored Data

1. Separate collection
2. Separation from rMSW
3. Separation from incineration residues

Fe  Al

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

1 2 3 1+2 1+3 1+2+3

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Findings Metall-Packaging:

• No significant dependance between density of collection sites and rate of collection

• Significant fewer recycling rate of metals when collected together with plastics

• Efficient separation from residual MSW completes the separate collection
Collection Types for Plastic Packaging

At each property

At collection sites

Recycling Center

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Collection Rate Plastic Packaging

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Comparison of Collection-point-system and Kerb-side-collection

Vergleich Bring- und Hol-Sammeltyp (Cluster 1,2,3)

kg/EW.a

<table>
<thead>
<tr>
<th>Category</th>
<th>B_LVP</th>
<th>H_LVP</th>
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<tbody>
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<td>sonst. LVP</td>
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<tr>
<td>Fehlwurf</td>
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</table>
Share of Impurities in the Material collected

Less Impurities at Kerb-side-Collection

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Impurities

Findings Plastic Packaging:

• Higher Collection Rate with Kerb-side-collection than with Collection-point-system
• Less impurities with Kerb-side-collection than with Collection-point-system
Conclusions – Key Lessons learned

• The more rural an area the more advantageous is a kerb-side-collection for paper, plastic packaging, biowaste
  – higher collection rate
  – less costs

• Information of Residents is a must - regularly
  – **Motivation** - Why to collect separately and to improve recycling - regional employment
    • strengthen national economy
    • reducing import of primary raw material – becoming more independent from volatile raw material market
    • saving the environment – locally and global
  – **Qualification** - How to collect seperately
    • which products
    • no impurities
  – **Feedback**
    • Opening treatment facilities to the public
    • Publication of results – successes and what could be done better

• Implementing separate collection and recycling with a reduction of residial MSW was a key factor for the acceptance of treatment facilities