How to manage these annoying recurring cost?

Part 3: Sources and instruments for cost recovery

Dr.-Ing. Wolfgang Pfaff-Simoneit
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2019 Waste Finance Academy
Accra / Ghana June 2019
How to manage these annoying recurring cost?

Part 1: Cost and cost structures of SWM systems

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Waste Management processes and technologies

Collection | Logistics | Sorting | Recycling

Composting | Pre-treatment | Incineration | Landfilling

Quelle: Faulstich 2008
<table>
<thead>
<tr>
<th>GDP [EUR /cap/year]</th>
<th>&lt; 2.000 [EUR/Mg]</th>
<th>2.000 – 4.000 [EUR/Mg]</th>
<th>4.000 – 6.000 [EUR/Mg]</th>
<th>25.000 – 30.000 [EUR/Mg]</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Method / Technology</strong></td>
<td>Source Separation of dry Recyclables</td>
<td>20 - 30</td>
<td>25 - 35</td>
<td>35 - 45</td>
</tr>
<tr>
<td></td>
<td>Sorting of high caloric Fractions / RDF</td>
<td>20 - 30</td>
<td>25 - 35</td>
<td>30 - 40</td>
</tr>
<tr>
<td></td>
<td>Composting of separately collected Bio-waste</td>
<td>20 - 30</td>
<td>20 - 30</td>
<td>20 - 30</td>
</tr>
<tr>
<td></td>
<td>Intensive Rotting / Fermentation of Bio-waste</td>
<td>50 - 60</td>
<td>50 - 60</td>
<td>50 - 60</td>
</tr>
<tr>
<td></td>
<td>Simple MBT</td>
<td>20 - 25</td>
<td>20 - 30</td>
<td>20 - 30</td>
</tr>
<tr>
<td></td>
<td>MBT intensive Rotting or Fermentation</td>
<td>40 - 50</td>
<td>40 - 50</td>
<td>45 - 55</td>
</tr>
<tr>
<td></td>
<td>MBS / MPS</td>
<td>45 - 55</td>
<td>45 - 55</td>
<td>45 - 55</td>
</tr>
<tr>
<td></td>
<td>Waste to Energy Plant</td>
<td>65 - 80</td>
<td>65 - 80</td>
<td>70 - 85</td>
</tr>
<tr>
<td></td>
<td>Thermal Waste Treatment</td>
<td>70 - 90</td>
<td>70 - 90</td>
<td>75 - 95</td>
</tr>
<tr>
<td></td>
<td>Sanitary Landfill</td>
<td>10 - 20</td>
<td>12 - 22</td>
<td>15 - 25</td>
</tr>
</tbody>
</table>
Waste management strategies

Quelle: Dehoust et al. / Ökoinstitut: Statusbericht zum Beitrag der Abfallwirtschaft zum Klimaschutz, im Auftrag des UBA, 2005
Full cost of SWM concepts

EUR / Mg

Type of Waste Management Concept

- Waste Type A1
- Waste Type A2
- Waste Type A3
- Waste Type A4
- Waste Type B1
- Waste Type B2
- Waste Type C1
- Waste Type C2
Cost and potential cost coverage

Waste Type B1

Revenue recyclables
Revenue Energy
Revenue Certificate
Cost minus Revenue
How to manage these annoying recurring cost?

Part 2: Minimising collection and disposal cost
Maximising waste recovery and revenues

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## Conclusions and outlook

### Conclusions

- Source segregation decisive for
  - development of recycling opportunities
  - sustainable utilization of organic waste
  - minimizing residual waste requiring expensive disposal and landfill volume
- Separate collection systems developed in high-wage countries less suited for low-wage countries
- Integration / inclusion / cooperation with informal sector required
- Appropriate collection systems offer
  - comprehensive employment opportunities
  - at reasonable cost

### Open questions

- Can social acceptance be achieved for the proposed collection concept
- Development of appropriate organizational models
- Development of appropriate fee charging systems
- Verification of the theoretical performance and cost figures in pilot projects
Proposed labour-intensive separate collection system
Collection of recyclables and waste at the front-door
Proposed labour-intensive separate collection system

Pushcart equipped with standardized waste bins
Proposed labour-intensive separate collection system

Tricycle equipped with standardized waste bins
Proposed labour-intensive separate collection system

Tuk-Tuk equipped with standardized waste bins
How to manage these annoying recurring cost?
Part 3: Sources and instruments for cost recovery

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Financing from general tax revenues

<table>
<thead>
<tr>
<th>Description</th>
<th>General taxes and duties</th>
</tr>
</thead>
<tbody>
<tr>
<td>Obliged to pay</td>
<td>All tax payers</td>
</tr>
<tr>
<td>Regulatory body</td>
<td>National Government, Municipalities for local taxes</td>
</tr>
<tr>
<td>Administration</td>
<td>Competent Ministry / Ministry of Finance</td>
</tr>
<tr>
<td>Behavioral steering effect</td>
<td>None</td>
</tr>
<tr>
<td>Example</td>
<td>Common practice in most countries</td>
</tr>
</tbody>
</table>

Key:
- Regulation
- Services
- Taxes and levies
- Solid waste financing
Environmental taxes and duties / Environmental funds

<table>
<thead>
<tr>
<th>Description</th>
<th>Obligated to pay</th>
<th>Regulatory body</th>
<th>Administration</th>
<th>Behavioral steering effect</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Taxes and duties for environmental protection</td>
<td>All tax payers</td>
<td>National Government</td>
<td>Competent Ministry</td>
<td>None</td>
<td>National environmental funds / several countries</td>
</tr>
<tr>
<td>Penalty payments for environmental pollution</td>
<td>Convicted polluters</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Charges for environmental authorisations</td>
<td>Applicants for environmental permissions</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Earmarked taxes and levies

<table>
<thead>
<tr>
<th>Description</th>
<th>Levies earmarked for solid waste management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Obliged to pay</td>
<td>Defined polluting and environmentally unfriendly installations, Tourists, Visitors</td>
</tr>
<tr>
<td>Regulatory body</td>
<td>National Government: General permission, Local Government: Local regulation</td>
</tr>
<tr>
<td>Administration</td>
<td>Local authority</td>
</tr>
<tr>
<td>Behavioral steering effect</td>
<td>None</td>
</tr>
<tr>
<td>Example</td>
<td>Environmental tourist tax Mallorca, Venice, Ibiza</td>
</tr>
</tbody>
</table>

Key:
- Regulation
- Services
- Taxes and levies
- Solid waste financing

Dr.-Ing. Wolfgang Pfaff-Simoneit | Sources and instruments for cost recovery

Landfill Diversion tax

**Description**: Tax or levy to be paid according to amount of waste disposed on a landfill / dumsite

**Obligated to pay**: Municipalities / Counties / Landfill operators

**Regulatory body**: National Government

**Administration**: National Government

**Behavioral steering effect**: Strong

**Example**: Landfill Diversion Tax UK

**Key**
- Regulation
- Services
- Taxes and levies
- Solid waste financing

**Sources and instruments for cost recovery**

Dr.-Ing. Wolfgang Pfaff-Simoneit
Extended Producer Responsibility (EPR) – Municipal service

- **Description**: Taxes or duties levied on defined products, e.g. packaging material
- **Obligated to pay**: Producers, Importers, Traders of dutiable products and materials
- **Regulatory body**: National Government
- **Administration**: National Government / Competent Ministry
- **Behavioral steering effect**: Medium
- **Example**: Ecotax / Eco-Lef Tunisia

**Key**
- Regulation (red arrow)
- Services (yellow arrow)
- Taxes and levies (green arrow)
- Solid waste financing (blue arrow)
Extended Producer Responsibility (EPR) – Service organised by obligated stakeholders

- **Description**: Taxes or duties levied on defined products, e.g. packaging material
- **Obligated to pay**: Producers, Importers, Traders of dutiable products and materials
- **Regulatory body**: National Government
- **Administration**: Obligated stakeholders
- **Behavioral steering effect**: Medium
- **Example**: Green Dot Germany

**Key**
- Regulation
- Services
- Taxes and levies
- Solid waste financing

**Diagram**
- National government
- Industry, commerce
- Private service provider
- Municipality
- Consumers
- Solid waste management Fund
- Contract
- Coordination

**Description**
- National government (Industry, commerce)
- Taxes or duties levied on defined products (e.g. packaging material)
- Producers, Importers, Traders of dutiable products and materials (National Government)
- Obligated stakeholders (Green Dot Germany)
Municipal user fees - I

<table>
<thead>
<tr>
<th>Description</th>
<th>Fee to be paid for municipal service</th>
</tr>
</thead>
<tbody>
<tr>
<td>Obligated to pay</td>
<td>Waste generators</td>
</tr>
<tr>
<td>Regulatory body</td>
<td>National Government (general regulation) Municipalities for local fee system</td>
</tr>
<tr>
<td>Administration</td>
<td>Municipality</td>
</tr>
<tr>
<td>Behavioral steering effect</td>
<td>Flat fee – none Volume based fee - high</td>
</tr>
<tr>
<td>Example</td>
<td>Widely applied</td>
</tr>
</tbody>
</table>

Key: Regulation | Services | Taxes and levies | Solid waste financing

Municipalities

National government

Citizens

Industry, commerce

Others
Municipal user fees - II

Waste management fee type and billing method – Commercial fee type

![Bar chart showing the distribution of waste management fee types across different income groups.](chart)

- **Low income**:
  - Flat fee per business: 50%
  - Business size or type: 6%
  - Fee per volume of waste: 2%
  - Other: 42%

- **Lower-middle income**:
  - Flat fee per business: 62%
  - Business size or type: 30%
  - Fee per volume of waste: 2%
  - Other: 8%

- **Upper-middle income**:
  - Flat fee per business: 26%
  - Business size or type: 39%
  - Fee per volume of waste: 13%
  - Other: 22%

- **High income**:
  - Flat fee per business: 33%
  - Business size or type: 33%
  - Fee per volume of waste: 33%
  - Other: 33%

Source: Worldbank, What a Waste 2.0
Municipal user fees - III

Waste management fee type and billing method – Household fee type

Source: Worldbank, What a Waste 2.0
Waste management fee type and billing method – Household billing method

Source: Worldbank, What a Waste 2.0
### Assessment of fee types and billing methods

<table>
<thead>
<tr>
<th>Fee type</th>
<th>Social adjustability</th>
<th>Behavioral guidance</th>
<th>Billing method</th>
<th>Revenue security</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flat fee</td>
<td>--</td>
<td>--</td>
<td>Joint property tax billing</td>
<td>++</td>
</tr>
<tr>
<td>Fee per volume</td>
<td>+</td>
<td>++</td>
<td>Direct solid waste billing</td>
<td>o</td>
</tr>
<tr>
<td>Fee per income level</td>
<td>+</td>
<td>--</td>
<td>Payment at central location</td>
<td>--</td>
</tr>
<tr>
<td>Property value</td>
<td>++</td>
<td>--</td>
<td>Door-to-door fee collection</td>
<td>+</td>
</tr>
<tr>
<td>Property location</td>
<td>+</td>
<td>--</td>
<td>Joint utility billing</td>
<td>+</td>
</tr>
<tr>
<td>Variable based on cost</td>
<td>--</td>
<td>o</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Full private service - waste and fee collection by collectors

Key

- Legal relation
- Material flows
- Cash flows
Full private service - waste and fee collection by collector’s association
Full private service - waste and fee collection by private service provider

Key:
- Green arrows: Material flows
- Yellow arrows: Cash flows
- Red arrows: Legal relation
- Red arrow with supervision: Tender / Supervision

Municipality

Citizens, commerce, others

Private company

Collectors

Tender / Supervision

Dealers, recyclers

Recyclables Market

Composting facilities

Compost market