How to do composting on farms? – The decentralised agricultural composting system in Austria

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Compost – Consulting & Development

100NGO
The decentralised approach for composting of bio-waste in Austria

8.8 mio inhabitants

<p>| | |</p>
<table>
<thead>
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<tbody>
<tr>
<td>Number of plants</td>
<td>404</td>
</tr>
<tr>
<td>Treated bio-waste &amp; sludge</td>
<td>1.14 Mt</td>
</tr>
<tr>
<td>Average treatment/plant</td>
<td>2 800 t</td>
</tr>
</tbody>
</table>

~ 21 000 INH or 9 500 HH per plant

Waste Management Plan 2017; Data from 2015
... Compost & Biogas Facilities = Members of Compost & Biogas Association Austria

Number composting plants AT 404 ➔ 284 / 70% with KBVÖe-QAS
Treated bio-waste & sludge AT 1.14 Mt ➔ 132 kg/INH ... = 300 kg/HH
Average treatment/plant 2 800 t
Austrian Compost & Biogas Association ... Members

![Chart showing members over years](chart.png)
The pillars of decentralised biowaste management

High quality home composting
(= prevention)

Separate collection
where home composting is not feasible

Favouring decentralised on-farm or municipal composting

~350 plants
National Regulatory framework

- The Austrian Biowaste Ordinance (1992)
  - *Obligation for source separation* and biological treatment of organic waste

- The Austrian Compost Ordinance
  - End of Waste *Quality Standards* for compost including documentation

- Guidelines for Best Available Techniques and good practice
  - *Technical standards* for design and operation of composting and Biogas plants

- Standards and guidelines for the use of compost & digestate
  - *ÖNORM* - Austrian *Standards* and technical sheets for *Compost Substrates* and application rules for digestate

- Implementation of the EU Animal By-Products Regulation
  - *Hygienisation / Sanitasation rules* for catering waste and other animal by-products
- Basic waste-economy-law since 1991
- Organisation and coordination of district wise waste management
- 180 recycling centres for 1.4 Mio Population
- 159 composting plants = 9000 INH/plant
- LAVU: Provincial Recycling Company with central recycling centre & logistic centre

Concept I ... **SEMI-RURAL-URBAN:**
Each Minicipality ➔ 1 Composting Plant
Municipal Waste Association of district FREISTADT
Austria  +43-7942/75432, office@bav-freistadt.at, www.umweltprofis.at/freistadt

Population | 64,900
Inhabitants / km² | 65
Nr. of municipalities | 27
Municip. >5,000 -10,000 | 1
Municip. > 2,000 -5,000 | 13
Municip. 1,000 – 2,000 | 12
Municip. < 1000 Inh | 1
Mean population per municipality | 2,400

Waste treatment | MBT/INC
CA-Site: Waste collected in % | 54% (!)
Residual waste - door to door | 13 x [48 %]
Nr. Composting plants | 10 food w.
Operator | Farmer
Av. quantity / plant | 1,000 m³
Dense net of recycling centres (RC)
Green waste delivery at the RECYCLING CENTRE
... or at specific **Garden Waste Collection Sites** – Good Examples
Garden Waste Collection Sites

Fencing – opening hours – what type of green waste

Fence

Opening days & hours

List of materials

Grünschnittübernahme
Samstag 8 bis 11.30 Uhr
Dienstag 13 bis 16 Uhr

- Grasschnitt
- Äste
- Laub
- Strauchschnitt
- Blumen
- Baumschnitt
- Fallobst
- Küchenabfälle
- Steine
- Bauschutt
Biowaste – composting decentralised plants

WMA
Coordination, consulting, plant planning advertisements, subsidies

Province Upper Austria
Consulting, subsidies

Municipalities
Contracting party subsidies

Farmers
Finances 25 to 50% of CapEx for construction and machines
collection + controlling
Compost production
Quality assurance – working group

Engineering
## The Farmers Contract

| Tender & Selection | ✓ Proximity: accessibility  
|                   | ✓ Approved Compost Master  
|                   | ✓ Land and human resources |
| Treatment         | ✓ Treatment of all materials received  
|                   | ✓ Waste license  
|                   | ✓ Operation according to “State of the Art of Composting”  
|                   | ✓ Gate fee: **€ 45 to 65.**  |
| Quality Management| ✓ Record keeping & documentation  
|                   | ✓ Membership in an Quality Assurance Organisation with at least yearly external inspection |
| Compost Use       | ✓ On own agricultural land according to “Good Agricultural Practice”  
|                   | ✓ Delivery to the City Council for the use in public park & garden maintenance as well as citizens  
|                   | ✓ Marketing according to Compost Ordinance |
Implementing the collection scheme

- 15 information evenings for individual quarters; „Waste counselors“ visit the households who couldn‘t attend these events
- After this the region was included in the collection scheme
- Distribution of 15 to 35 Litre buckets to each household
- Every bucket with name and address
- Weekly emptying
- Collection is done by farmers
Simple collection trucks also for bio bins
Concept II: **Semi-Rural-Urban**
St. Pölten District (Lower Austria)
ONE District ➔ **several** Composting Plants

- **Inhabitants:** ~ 98,000
- **Area:** ~ 1,043 km², rural structure
- **Municipalities:** 37
- **Households:** ~ 37,700
Concept II … **SEMI-RURAL-URBAN:**

ONE District ➔ several Composting Plants

Delivery of the bio-waste in an alternating rotation to *5 different agricultural on-farm composting plants*

Kerbside collection at every house
Intensive SS of foodwaste in urban areas.
The collected biowaste

- MSW from HH: 38,000 tons = ~1,008 kg/HH = 403 kg/Inh
- Biowaste (DtD): 5,800 tons = 154 kg/HH = 62 kg/Inh
  
  [for HH / INH WITH a bio-bin = 406 kg/HH = 162 kg/INH]

- Bulky green waste: 4,900 tons = 130 kg/HH = 52 kg/Inh
- Fine green waste: 3,000 tons = 80 kg/HH = 32 kg/Inh

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- Total Organics 13,700 tons = 364 kg/HH = 146 kg/Inh

  = 36% of total household waste

- Households with Bio-bin: ~38%
St. Pölten:
5 composting plants within the district
The City of Graz

- Inhabitants (Inh)
  - Graz: 287,000
  - Suburbs: 35,000

- Population density
  - Graz: 2,250/km²
  - Suburbs: 100/km²

Concept III: Agro-Urban Cooperation

The capital of the province of Styria
The Graz Compost Cycle – from WASTE to PRODUCT

Collection of bio-waste

- Organisation & control by Holding Graz - Waste Management
- Collection by SERVUS ABFALL

Pre-treatment of bio-waste

- Pre-treatment facility of the der Holding Waste Management

Composting

- 18 agricultural and commercial composting plants in the province of Styria
- A.D. BioErde und Kompost GmbH

Marketing of products

- At the Recycling Centre of Holding Graz Waste Management
Graz – Door to Door collection:

- **Obligatory Residual Waste bin** (120 / 240 / 1100 liter)
- **Collection:** 5 x /week to 1x /month

<table>
<thead>
<tr>
<th>Bin</th>
<th>Waste fee / year</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Collection:</td>
</tr>
<tr>
<td>120 litre</td>
<td></td>
</tr>
<tr>
<td><strong>Home compost bonus</strong></td>
<td></td>
</tr>
<tr>
<td>240 litre</td>
<td></td>
</tr>
<tr>
<td><strong>Home compost bonus</strong></td>
<td></td>
</tr>
<tr>
<td>1100 litre</td>
<td></td>
</tr>
<tr>
<td><strong>Home compost bonus</strong></td>
<td></td>
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</tbody>
</table>

- **Obligatory Bio-Bin:** 50 % of Residual Waste volume
  - 17.400 * 120 l / 11.550 * 240 l / 250 * 1.100 l
  - = **29.200 bins** = 15 l / EW
  - 5 trucks, 2 with cleaning device, 15 drivers/loaders
  - **BUT:** Possibility to opt out
    - **Home compost bonus**

- **Collection frequency:**
  - April – October = 1 x/week
  - November – March = 1 x/2 weeks
  - = **38x /yr**

- **Paper and cardboard** ➔ currently ca. 75% ... 240 litre **red lid** ➔ included in residual waste charge

- **Plastic packing material**
  - 110 litres **Yellow bags** // 1.100
  - litres container ➔ multi-storey building
  - ➔ collection is covered by packaging license fee under the Packaging Ordinance (Producer Responsibility Scheme)
### URBAN central pre-treatment of source separated bio-waste

Delivery of pre-mixed bio-waste for composting to several farms

<table>
<thead>
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<th>Graz: 287.000</th>
<th>Suburbs: 35.000</th>
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<tr>
<td>Population density</td>
<td>Graz: 2.250/km²</td>
<td>Suburbs: 100/km²</td>
</tr>
<tr>
<td>HH with Bio-bin</td>
<td>Graz: 77% (95%)</td>
<td>Suburbs: 41%</td>
</tr>
<tr>
<td>HH with Home composting</td>
<td>Graz: 15%</td>
<td>Suburbs: 85%</td>
</tr>
</tbody>
</table>

#### Collected and treated organic waste

<table>
<thead>
<tr>
<th>Waste Type</th>
<th>Graz:</th>
<th>Suburbs:</th>
<th>kg/Inh</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOWASTE</td>
<td>22.000 t</td>
<td>3.000 t</td>
<td>76 kg/INH</td>
</tr>
<tr>
<td>GREEN WASTE</td>
<td>7.000 t</td>
<td></td>
<td>94 kg/INH</td>
</tr>
<tr>
<td>TOTAL</td>
<td>32.000 t</td>
<td></td>
<td>100 kg/INH</td>
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City of GRAZ Austria
Pre-Treatment and Mixing Bio-Waste & Green Waste at Central Recycling Centre

- Shredding of woody garden waste
- Separation of bulky impurities
- Mixing of bio-waste from the bio-bin with garden and park waste
- Separation of ferrous metals with magnetic separator
- Automatic loading of transport containers (ca. 9 t / container)
- Collection of leachate / press water from collection trucks

Transport: < 50 t/d (January to February) up to >200 t/d are delivered to 18 composting plants (maximum 75t/d per plant because of the rules of the INDUSTRIAL EMISSION DIRECTIVE - IED)

Specific costs: Pre-treatment: € 19,67/t | € 480.000,-/a
Transport: € 11,78/t | € 380.000,-/a
Graz – Step 2: Transport to 18 Agricultural On-Farm Composting Plants

Province of Styria

< 81 km

> 19 km

City of Graz

Graz
Graz – Quantity of Biowaste delivered to the On-Farm Composting Plants

<table>
<thead>
<tr>
<th>Max capacity of composting plants</th>
<th>200 – 12.500 tons</th>
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<tbody>
<tr>
<td>Input per Farm * year</td>
<td>200 – 5.000 tons</td>
</tr>
<tr>
<td>Composting gate fee for farmers</td>
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<tr>
<td>Biowaste</td>
<td>36,85 € t⁻¹</td>
</tr>
<tr>
<td>Green waste</td>
<td>14,14 € t⁻¹</td>
</tr>
</tbody>
</table>

Quantity of Bio and Green Waste distributed to 18 On-Farm Composting Plants

![Bar Chart: Quantity of Bio and Green Waste](chart.png)

- Biowaste
- Green waste
- Biomass

Tons

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
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Bioabfall
Apfelbutzn rein, Plastik nein
PR – Concept KBVÖe
Many Thanks!

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